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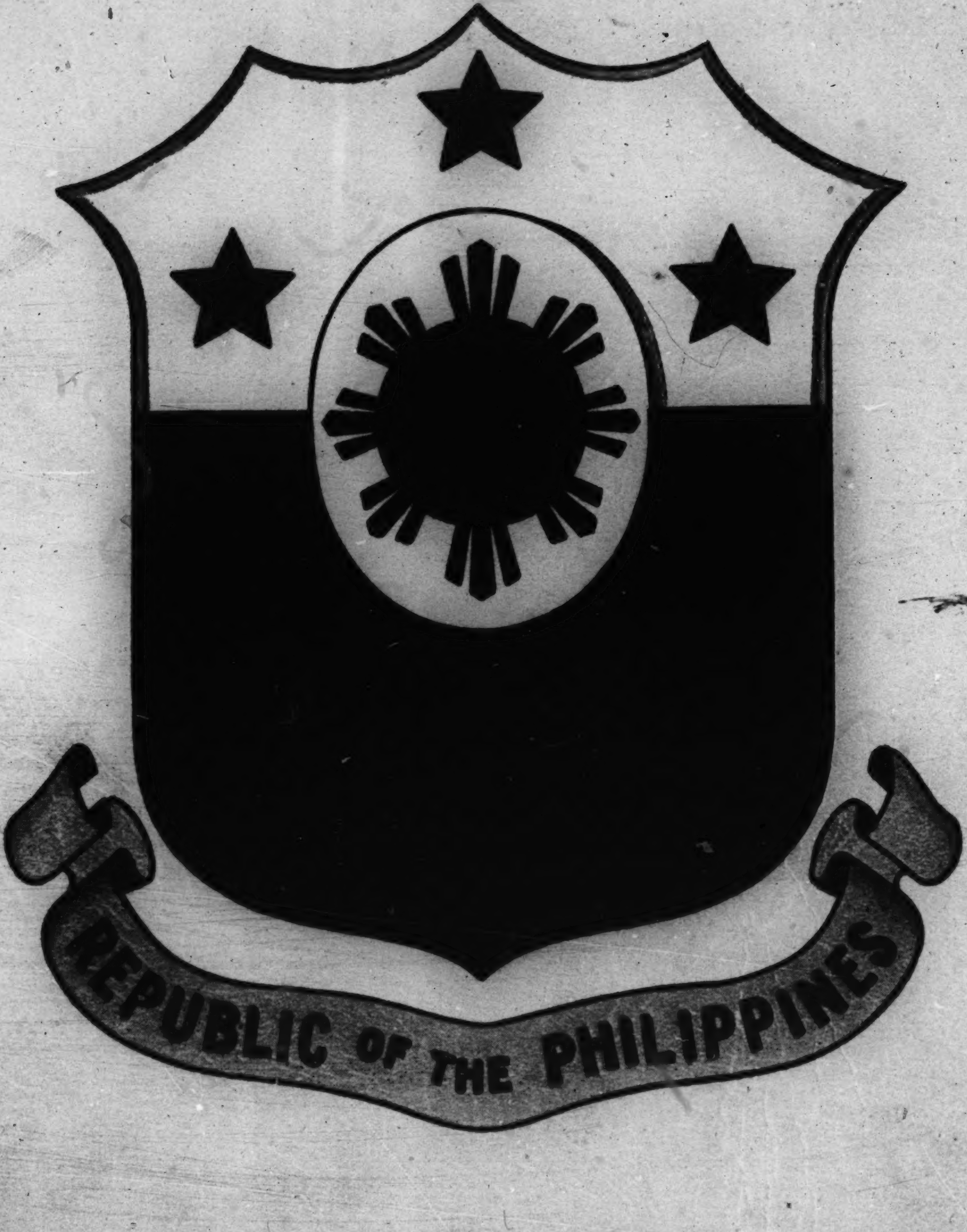
REPUBLIC OF THE PHILIPPINES

Proposed Program for Industrial Rehabilitation and Development

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Proposed Program
for
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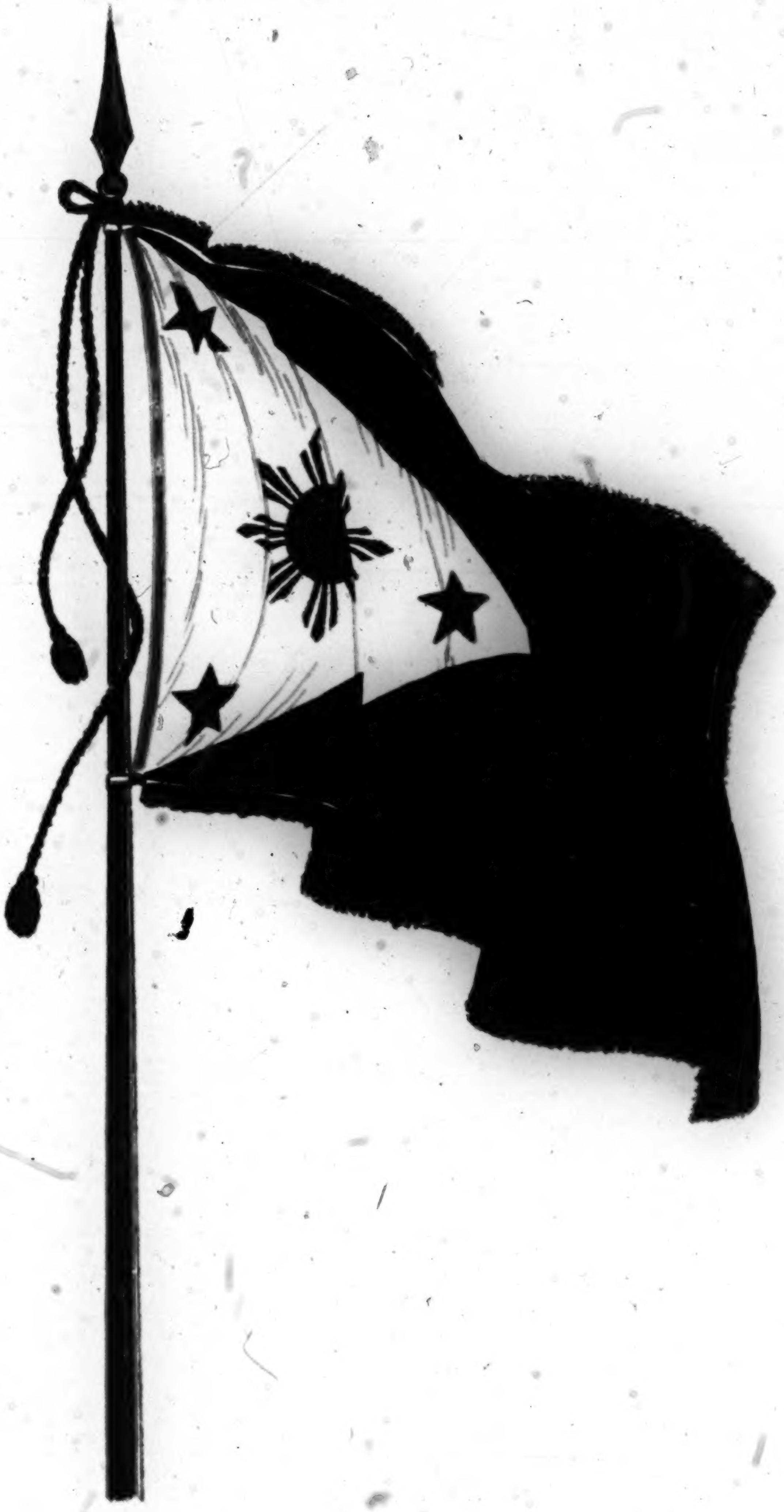
Republic of the Philippines



MALACAÑAN PALACE

PREFACE

The Beyster Report which is now being presented to the public is the proposed blueprint of the industrialization of the Philippines. This program will be submitted to the National Economic Council for consideration and approval. The Philippine Congress will be asked to implement this program.

It has been a pleasure for me personally to go over this book which has been produced after a thorough and painstaking investigation of the total destruction wrought by the Japanese in the Philippines and of the industrial possibilities of this country today.

This book contains essential data on the great opportunities that exist in the Philippines for the investment of capital and the utilization of technical knowledge. The possibilities of industrialization and mechanization in this country are vast indeed.

It might be of interest to all investors to know that the government of the Philippines believes in the principle of free enterprise and is committed to a program of encouragement for all who might wish to help us industrialize, to the end that we might rise to the level of all progressive and industrialized countries of the world.

It is for this reason that we have gone to the extent of amending our constitution to allow American citizens to participate in the ownership and control of public utilities and in the development of our natural resources.

We invite American capital to participate actively toward the steady and rapid development of the Philippines. Here in broad outline is the proposed blueprint of our industrial growth. This proposed program is not a four or five-year plan. The Republic of the Philippines is a free country and there will be no regimentation of business. The program is based on free enterprise.

Manuel Roxas

MANUEL ROXAS
President of the Philippines.

Manila
October 27, 1947.

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Prepared by

The Technical Staff

of the

NATIONAL DEVELOPMENT COMPANY

under the supervision

of the

H. E. BEYSTER CORPORATION

Consulting Engineers

Detroit, Michigan, U. S. A.
Manila
October 28, 1947

First printing -- October, 1947.
Second printing —November, 1947
Checked and Revised.

Printed by
BENIPAYO PRESS
Manila, Philippines

FOREWORD

This revised edition supersedes the preliminary report which was issued on June 24, 1947. Certain clarifications of controversial issues have been made in this new report, the volume of which has been considerably expanded.

The technical memorandum produced herewith was prepared by the Technical Staff of the National Development Company under the supervision of the H. E. Beyster Corporation of Detroit, Michigan, U. S. A.

This report is submitted to the Republic of the Philippines for study of the basic outline of the proposed industrial development program as herewith presented. In addition to certain background material which is considered to be essential, it contains condensations, digests and excerpts of the more extensive and voluminous reports which have been prepared on separate industries and enterprises.

Acknowledgment is hereby made to the various government and private agencies and the host of individuals who have so earnestly cooperated and given their wholehearted support to the preparation of this work. Their records, statistics, time, technical knowledge and personal opinions have constituted valuable aids in this preparation.

It should be stressed from the very beginning that this proposed program is not to be construed in any way as a statement of policy. It has been put forward merely in the form of a suggestion and its main aim is to glance over the possibilities of development in the Republic of the Philippines.

The impossibility of making any detailed and complete survey of the national economy in such a short period is fully and clearly realized. At the same time, however, it is felt that an extensive and more detailed report would have consumed too much time. There is urgent need for an overall agro-industrial program in the Philippines today and the chief purpose has been to formulate a general plan as rapidly as possible, at the same time giving thought and care to the presentation of the essentials covering the desired economic development of the Republic.

October 28, 1947

CONTENTS

PREFACE BY HIS EXCELLENCY, MANUEL ROXAS, PRESIDENT OF THE REPUBLIC OF THE PHILIPPINES.

Foreword

Page

PART I : POTENTIALS

NEW HORIZONS 1

PART II : ECONOMICS

ECONOMIC VISTA 35

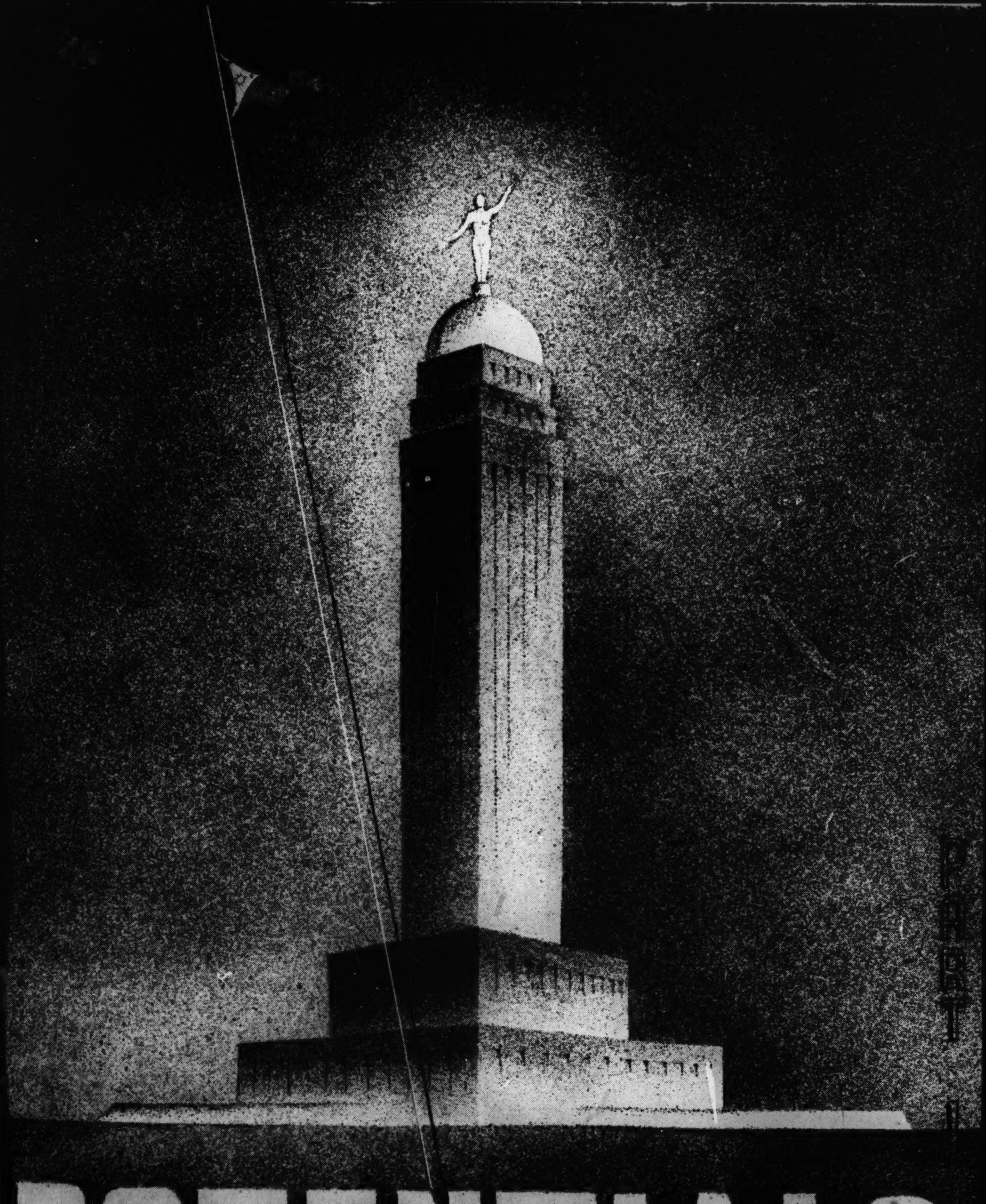
PART III : INDUSTRY

PREFACE: ACCENT ON INDUSTRY

1. METAL 89
2. CHEMICALS 117
3. MINING & QUARRYING 135
4. FOOD & FARM 153
5. TEXTILES 189
6. FOREST PRODUCTS 193
7. PUBLIC SERVICES 209
8. MISCELLANEOUS & MINOR INDUSTRIES 231

PART IV: APPENDICES

ACKNOWLEDGMENTS



PART I

POTENTIALS

NEW HORIZONS

THE BATTLE OF Manila Bay in 1898 introduced the Philippines to a new and spacious era of prosperity that was to establish them as the hub of Pacific trade. It was also the dawn of a new era in the foreign relations of the United States and the extension of its influence to the Orient. With the coming of the Americans, the western world was able to learn something of the size and latent possibilities of this sweeping archipelago, these thousands of islands with their fertile plains, great rivers, ranges of high mountains, their millions of acres of virgin forest-land and the tremendous untapped resources lying fallow in the rich soil. American leaders suddenly awoke to the fact that the strategic placing of these islands lent itself to the establishment of a new trade center in the Orient.

That was only the start. America became Philippine-conscious overnight and there was a surge of national enthusiasm for this new-found tropical paradise. The islands rose to undreamed-of prosperity as one of the leading trade centers of the East and new wealth flowed into the country as it never had before. In the light of history, it can now be seen that the policy of the United States with regard to the Philippines was essentially altruistic. Two of her principal contributions to the development of the nation were to provide improved economic standards and direction in commercial endeavor in the shape of an influx of energetic American enterprise, which set a new and livelier pace in the business and overall economic life of the nation. There is no doubt whatsoever that these two factors opened up the country and expanded its previously limited horizons. Traders landed on these shores, surveyed the possibilities, and made use of the latent opportunities. On the whole, the directing motive in colonial enterprise was surprisingly good and there was comparatively little exploitation, judging from any overall survey of the situation after 40 years of American guidance.

Two principal contributions

The next stage in the development of the nation, however, was again set to the accompaniment of the sound of war. This time it was Japanese aggression that brought the Philippines sharply back into American focus. The life blood of the nation was steadily drained by the invader, who, in three desperate years, succeeded in liquidating the hard-won gains of forty years of prosperity. The country was laid waste to, and with the liberation came the final destruction. When the smoke from burning buildings had subsided, Manila, once the "Pearl of the Orient", lay in smouldering ruins. Bridges had been blown up. The nation's extensive network of communications was completely disrupted. Trade was non-existent. Starvation stalked the islands, which had been bled dry by the temporary invader from the north.

New era of advancement.

That was the picture when the Americans returned to the Philippines in 1945. It was history repeating itself. Once again, as had happened forty-seven years previously, a new era of advancement dawned for this green cluster of islands. Out of the ashes of war there emerged the final redemption, for on July 4, 1946, the free and independent Republic of the Philippines was born.

The world is now fully conscious of the integral part that this new-born nation must play in the eventual re-shaping of the entire Orient.

History is being moulded not only in the diplomatic council halls but also in the business offices of the world. The battle of arms is over, but the battle of economic salvation has just begun. It is now just over one year since the Philippines acquired national independence. Her economic independence, however, is still around the corner. The next few critical years will decide whether this corner can be turned successfully or not. Great new projects are being planned and put into operation. The devastation caused by the war has been tremendous, but now, if ever, is the chance to remould the Philippines into one of the leading trade centers in the the Far East, for these islands have an untapped potential that has definite possibilities, in addition to being well placed strategically to command trade in the Pacific.

Topography of islands

With a land area of 115,600 square miles, the Philippine archipelago lies just north of the island of Borneo and south of the island of Formosa. It consists of 7,083 islands extending in the form of a huge triangle 1,152 statute miles from north to south and 688 statute miles from east to west. This amazing group of islands is generally of volcanic origin, being the higher portions of a partly submerged mountain mass. The slopes of some of the mountains are so steep and the rock strata so shattered as to be in a condition of unstable equilibrium. The serious geological disturbances which brought these mountains into being have resulted in frequent faults in the mineral deposits. On the whole, most of the larger islands are traversed by mountain ranges, with wide valleys and deltas, extensive coastal plains, navigable rivers, waterfalls and volcanoes. Some of them, such as Bohol and Cebu, are in great part overlaid with coral, which in disintegrating has given this particular soil characteristics markedly different from that of most of the larger islands, where lava overflow and volcanic tuff and ash deposit have affected extensive districts and resulted in some curious phenomena — areas of extremely fertile soil adjacent to land almost incapable of successful cultivation. Some of the small islands in the southern seas are wholly of coral formation, fertile, but without dependable springs or other sources of potable water. The soil in many districts is rich. There is no wholly arid region.

Mineral and thermal springs are found in many places in the Islands, and some are notable for their beneficial effects in the treatment of disease.

Three natural divisions

The archipelago comprises three natural divisions: on the north, Luzon, Mindoro, and adjacent islands; in the centre, the

Visayas, of which the island of Samar is the largest, while Cebu, Panay, and Negros are preponderant in population and commerce; and on the south the great island of Mindanao and the Sulu Archipelago extending to the very shores of Borneo. Of all the islands in the group, Mindanao has the largest area of undeveloped agricultural land. There are also great areas of undeveloped fertile land naturally adapted to agriculture in the Visayan Islands, especially in Leyte and Samar, as well as on the large islands of Mindoro and Palawan; and, although it supports by far the largest population, there are still extensive uncultivated fertile regions in Luzon.

Land area

About 95 per cent of the land area lies in the eleven largest islands, and approximately two-thirds in the two great islands of Luzon with 41,000 square miles and Mindanao with 37,000 square miles of area. These large islands bear heavily wooded mountains, cultivable hills, fertile lowlands, and rolling uplands, some of which attain an elevation exceeding two thousand feet.

The principal islands are traversed by large rivers, many of which are navigable. There is abundant potential water-power in fast-moving streams, swift rivers and cascading waterfalls, the most famous among the last-named being the Maria Cristina falls in the northern end of Mindanao. The sources of practically all the rivers and smaller streams are in the heavily forested uplands, with the result that there is a dependable, and in many cases abundant, flow of water, not only for power, but also for irrigation, without the necessity of building reservoirs.

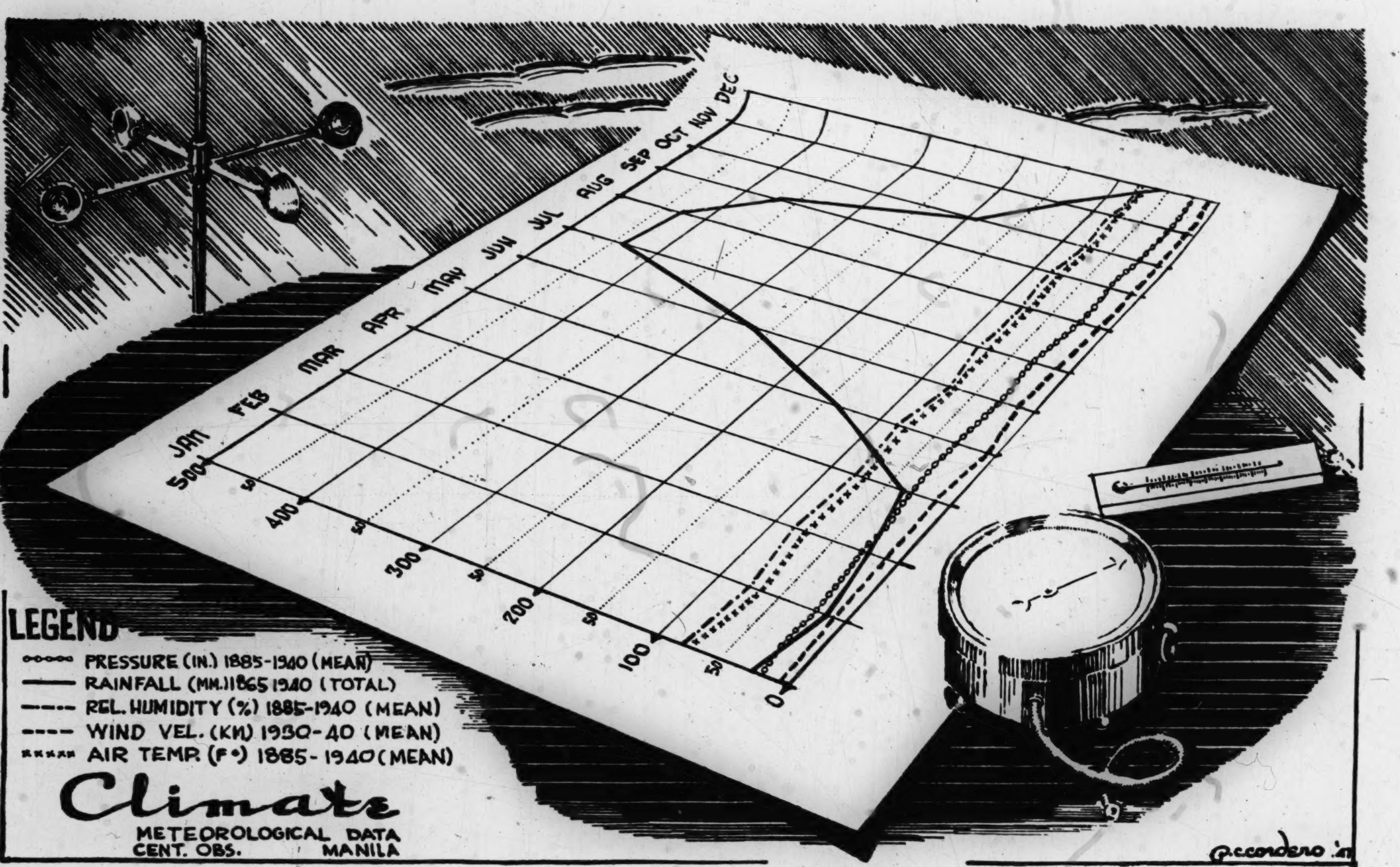
Abundance of fish

In the interior of some of the larger islands there are extensive lakes, some of which are navigable and in most of which there is an abundance of fish. Near the sea are large areas of swamps, important by reason of their growth of mangrove, nipa palm, and wood for fuel. Some of these have been ingeniously developed for use as controlled fisheries, and others for salt works.

The seas, within and adjacent to the archipelago, teem with natural resources. Besides the food fishes, there are profitable pearl fisheries and an abundance of commercially valuable shells and sponges.

Climate

In the lowlands the climate throughout the year is warm, moist, and rather enervating to foreigners, particularly westerners, who, during the hotter months, seek refuge from it in the mountains, where there are pleasant resorts. The average temperature in Manila, 79.5°F., is typical of the lowlands throughout the archipelago.



Climate

METEOROLOGICAL DATA
CENT. OBS. MANILA

Baguio City, the summer capital, 5,000 feet above sea level, normally has an average mean temperature of 64° F. The temperature at night, even in the lowlands and at all seasons of the year, is agreeably cool, and in January and February, the coolest period, is sometimes as low as 59°F. at Manila.

Rainfall

The seasons are divided into the northeast monsoon, which brings frequent rains on the east coast of the islands, and the southwest monsoon, which brings the rainy season in Manila and on the west coast. In the southern part of the archipelago, the rainfall is well distributed throughout the year. The rainfall is very heavy, in certain sections as much as two hundred and fifty inches annually, and occasionally more. The hottest months are April and May.

Population

Conservative estimates place the population at 19,273,210 for 1947 as against 16,000,000 in 1939, 10,314,310 in 1918 and 7,635,426 in 1903. The population is unevenly distributed, the greatest density occuring in the island of Cebu and the least in Mindanao. The Filipinos have settled chiefly in areas along the sea coast rather than in the fertile valleys of the interior.

Distribution of employment

Of the 8,456,493 men and women gainfully employed in the Philippines prior to the war, agriculture accounted for about 41 per cent; domestic and personal services, 29 per cent; professional services, 11 per cent; and manufacturing, industry, trade and transportation, the remaining 19 per cent.

The primitive and semi-civilized peoples constitute about nine per cent of the total population of the nation. These tribal peoples are the unassimilated descendants of aborigines and of immigrants in prehistoric times from the continent of Asia and the islands of the Indian and Pacific Oceans.

Original inhabitants

The aboriginal inhabitants were without doubt very primitive dwarf peoples of three distinct types: the negrito, a pygmy negro with frizzled black hair and very dark skin; the straight-haired pygmy of Mongoloid type and brown skin; and the third combining characteristics of both the aboriginal Australian and the Ainu of Japan. These three aboriginal types long ago became mixed with each other, but the Negrito is still the most readily distinguishable.

The Christian Filipinos of Malay extraction constitute over 90 per cent of the total population. They are the most dominant peoples of the Philippines and from their number are derived most of the social and political leaders of the country, the educators, the business and professional men, the government officials and employees, and the agricultural and industrial workers.

Spread of Catholicism

It is interesting to note that the Philippines is at present the only Christian country in the Orient. The early Filipinos, soon after the Spanish conquest, readily embraced the Christian faith. The missionaries who accompanied the Spanish conquistadores converted the natives to Catholicism, which spread rapidly throughout the archipelago. The work of the Roman Catholic Church in the Philippines has been a potent factor for good in the history of the people. It dealt with the disunited, warring factions and tribes which the Spaniards found in the country at the period of their conquest and gave them that unity of thought which comes from a common religion to which they are devoted.

Up to the time of the arrival of the Americans the Roman Catholic Church had largely dominated the State. But the magnitude of the service rendered by the Church should not pass unrecognized.

Three principal religions

There are now three principal religions: Roman Catholicism, Protestantism and Mohammedanism. In 1901, the Philippine Independent Church was established by the late Monsignor Gregorio Aglipay, a Filipino priest who left the Roman Catholic Church. The new religion retains most of the beliefs and ritual of the Catholic Church. Protestantism came with the American occupation and spread its doctrine in many parts of the Islands.

English and Spanish are the two foreign languages universally used in the country. Of the native tongues, Tagalog, Ilocano, and Visayan are the most predominant, while the non-Christians have an entirely different dialect from the Christian people. Tagalog has been proclaimed to be the national language.

Recorded history

The recorded history of the Philippines does not date back merely to the discovery of the islands by the Spanish explorer and navigator Ferdinand Magellan in 1521. As early as the 13th century the Chinese geographer Chao Ju-kua made mention of the archipelago. The Philippines, which was then called Ma-yi, was enjoying cultural and commercial relations with China, Japan, India, Siam, Cambodia, the Malay Peninsula, Java, Sumatra, Borneo and the Moluccas.

Culture

A fairly complex culture existed in the Philippines at the time of the Spanish arrival. A certain system of responsible government was maintained, the people were wearing cotton and silk sarongs and were using gold, ivory, jade and silver ornaments. Although Hindu influence was unmistakably of a more defined impress, the culture of the people as a whole remained uniformly

Malayan.

The people could not, in the main, have been considered uneducated. A system of writing existed which followed closely the Phoenician alphabetical arrangement and calendars, and a regular system of weights and measures was in use.

Widespread progress

Soon after the arrival of the Spaniards the Filipino people embraced Christianity and through the medium of missionary schools learned the Roman system of reading and writing. Widespread progress was made in spite of the fact that the educational system adopted in the mission schools was inefficient and not conducive to high literacy percentages.

The American occupation of the Philippines in 1899 brought about a thorough change in the public school system. The English language was used as a medium in all schools and colleges and has been used since. The new system as introduced and adopted benefited the Christian population as well as the non-Christian tribes.

The public school system includes primary, elementary, and secondary schools and a university with various collegiate courses. Besides the state-owned university there are a number of privately-owned universities and colleges of recognized standing.

Older than Harvard

As early as 1611 the Spaniards established the University of Santo Tomas, which makes this seat of learning 25 years older than Harvard University.

The growth and expansion of the American public school system was at its peak at the outbreak of the second world war. Literacy percentages were extremely high and the number and size of schools entirely adequate. However, the Japanese occupation undermined this system and educational standards rapidly declined. Teachers were loathe to continue teaching except as a last resort due to force or the necessity of earning a livelihood and students were reluctant to attend classes, not only because of their dislike of the Japanese system and control, but because they felt that the occupation would be shortlived and that their education would have been wasted in any event. Despite this, the literacy rate of the Republic has been estimated at 80.7 per cent, which is very much higher than any other country in the Far East. This fact in itself is one of the greatest assets of the nation.

English spoken everywhere

English is spoken everywhere in the Philippines. As a matter of fact, any foreign traveller who speaks only English can travel in any part of the archipelago and be readily understood by the people.

The fact that the Philippines has always been a predominantly agricultural nation may be attributed to a variety of reasons. The tropical climate and the naturally fertile soil were doubtless the two main contributing factors. Unlike Japan, for instance, which was incapable of supporting herself agriculturally and was thus forced to industrialize, the Philippines possessed such an abundance of agricultural produce that the population has always had a means of sustenance at hand. It has so easily been come by that the people were never forced to turn their hands to anything else. The population increased steadily because of this super-abundance, but their good fortune was also in many ways something of a handicap, for it tended to retard the industrialization of the country. If this inexhaustible supply of the necessities of life had not been so easily accessible, it might possibly have been for the eventual betterment of the nation itself, for the people would have been inclined more toward industry.

Accent on agriculture

The time has now come for the extensive development of the mineral as well as agricultural resources of the Philippines. Up to the present, the main focus is still on agriculture. The six major farm crops are rice, corn, abaca (Manila hemp), coconut, sugar cane and tobacco. Of these, rice and corn cover the largest hectarage and constitute the leading staples of the country. As exports, the principal agricultural products are sugar, coconut, abaca and tobacco, in that order of priority.

National resources

The national resources of the Philippines are divided into six major classifications:

1. Mineral resources (to include metallic, non-metallic and fuel minerals)
2. Agricultural
3. Forestry
4. Animal industry
5. Fisheries
6. Power resources

* With regard to the mineral resources, the Philippines made more rapid progress in gold production than any other country in the world during the last nine years prior to the outbreak of the Pacific War. There were 40 gold mines in 1940 with an aggregate gold production amounting to ₱76,563,888 as compared with ₱62,630,306 in 1938, and silver, ₱1,874,094 as against ₱1,487,155. At present, very little production is indicated owing to non-availability of mining equipment.

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* *NOTE: For further reference to mineral production, please refer to production charts at end of Appendix.*

History of gold mining

The history of Philippine gold mining goes back many generations. Natives of Mountain Province were making ear-rings and other ornaments of gold long before Spanish explorers penetrated the region. Mining efforts on the part of the Spaniards were desultory and handicapped by lack of capital, and the yellow metal remained safe in its mountain fastness during the three and a half centuries of Spanish rule. In 1544, gold was mined by the natives in Masbate, Mindanao, and Paracale.

Modern gold-mining was initiated only some 30 years ago. With improved knowledge of the science of metallurgy and adequate capital and initiative, American prospectors met with conspicuous success in the Benguet region of Mountain Province. Thus was more extensive interest in prospecting and investment of both American and Philippine capital stimulated, and finally in 1933 the increase in price of gold encouraged the development of low-grade properties previously regarded as unprofitable.

Principal gold bearing districts

The principal gold-bearing districts of the Philippines are the following:

1. Mountain Province
2. Camarines Norte
3. Surigao
4. Masbate

Gold has been found in promising quantity in many other provinces also and productive mines have been developed in some of the provinces, but only the four districts named above have thus far been sufficiently explored to determine the character and extent of mineralization.

Mountain Province and Masbate

Ore from the lodes of Mountain Province and Masbate is simple in character and well adapted to free milling types of treatment. For this reason modern mines were first established there. The district around Baguio is particularly rich in mineralization and early acquired a commanding lead in the gold mining industry. But to Masbate goes the distinction of having the largest mine in the Philippines, a plant capable of milling 4,000 tons of ore daily. This mine was not the leader in gold production, however, due to the rather low grade type of ore handled.

Camarines Norte and Surigao

Ore from Camarines Norte and Surigao is highly refractory, containing substantial amounts of copper and other metals which frustrate treatment by cyanide. Development of large mines in these districts had to await introduction of the modern flotation process of extraction which yields a concentrate which may be profitably smelted for both gold and copper.

Although the position of Mountain Province in the gold-mining industry has remained unchallenged for centuries, some very old and productive mines are located in the province of Camarines Norte, southern Luzon. In 1629 one Don Diego de Espina discovered a rich vein in this region where Chinese pirates had sacked gold in the fifteenth and sixteenth centuries. Long before the rich gold deposits of Benguet were known, Paracale and Mambulao were the scene of much mining activity, and today this region in Camarines Norte is being developed extensively.

Spectacular growth

Its storehouse of gold unlocked by the flotation process, the Camarines Norte district witnessed a spectacular growth in the size and number of its mines during the 10 years preceding the war, rapidly approaching the long established leadership of Mountain Province. At the time war intervened, in addition to operating mines, Camarines Norte had numerous promising properties under development and it is believed that some of these would have become successful producers.

Surigao started later than Camarines Norte but likewise enjoyed rapid and spectacular growth. One of its mines is unquestionably the richest in the Far East, if not in the world. The 1941 production figures of this mine are as follows:

Production data of Surigao

PRODUCTION DATA

Month	Tons Milled	Values Recovered Per Ton	Monthly Recovery in Pesos
January	6,958	31.55	219,508
February	6,304	33.32	210,076
March	7,151	30.86	220,662
April	6,782	47.06	319,142
May	7,446	75.74	563,947
June	6,956	101.19	703,842
July	7,547	100.30	756,964
August	8,505	118.22	1,005,484
September	8,604	131.47	1,131,180
October	9,300	83.23	774,036
November	9,125	97.51	889,773
December (½ month)	5,046	92.79	468,200
Totals	89,724		7,262,814
Average per ton		₱ 80.95	

Production increased by leaps and bounds, rising from a total value of about ₱10,000,000 in 1932 to over ₱78,000,000 in 1940. Shipped to the United States in the form of bullion, gold in 1938 became second only to sugar in Philippine export trade.

The great progress which this industry made during the 10 years prior to and including 1940 is revealed by the following figures:

Gold production 1931-1940

1931	₱ 7,524,867
1932	10,300,167
1933	16,190,795
1934	23,701,923
1933	31,692,620
1934	23,101,923
1935	31,692,620
1936	44,402,653
1937	51,260,646
1938	64,623,205
1939	74,131,216
1940	78,308,289

NOTE: Chamber of Mines of the Philippines figures, based on mill values, used from 1935 onwards.

Big Wedge Mine

At present there is only one mine, the Big Wedge, producing in the Baguio area. In October, 1947, the Big Wedge yielded 12,574 tons valued at ₱438,234. Balatoc-Benguet, will be in operation before the end of this year. This mine is expected to start at 1,200 tons daily capacity and will gradually step up production to 4,000 tons daily.

Of Luzon's total gold production in 1940 — valued at ₱62,000,000, or 79 per cent of the country's output — Mountain Province accounted for 68 per cent and Camarines Norte for 28 per cent. The insignificant remaining amounts came from one mine each in Camarines Sur, Bulacan, and Batangas provinces, all in Luzon.

Large portion of base metals

In addition to gold the mountain ranges in Luzon yield a large portion of the base metals which in recent years have assumed a position of major importance in Philippine export trade and economy.

Copper

Nearly 95 per cent of Philippine production of copper concentrates in 1940 came from Mountain Province and Camarines Norte, the oldest and largest mine being at Mankayan in Mountain Province. Here the Spaniards found Igorots using Chinese methods of mining and smelting the ore. Eighty-five per cent of Philippine copper ore, exported without beneficiation, came in 1940 from Rapu-Rapu, a small island east of the mainland of southern Luzon, and part of Albay province. Copper ore went entirely to Japan before the war, while copper concentrates were shipped to the United States as well as to Japan.

Extensive deposit in Negros

Recent reports indicate that there is an extensive copper deposit in the island of Negros. Preliminary analyses have indicated that it is of low-grade classification bearing one per cent copper ore.

According to American mining experts, this ore is similar to the low-grade ore of Arizona.

The estimated reserve makes it appears as if this area may be an ideal site for a copper smelting and refining mill of 15,000 tons capacity per year.

Iron

There are seven major iron ore deposits in the Philippines containing 60 per cent iron with a total reserve that has been estimated to range 11,000,000 and 22,000,000 tons. An additional reserve of approximately 1,000,000,000 tons is contained in the Surigao deposit in the island of Mindanao.

This latter deposit has been described from a metallurgical and geological standpoint in a later section of this prospectus.

Philippine Iron Mines, Inc.

1. Philippine Iron Mines, Inc. at Larap, Camarines Norte, Luzon, has an annual production capacity of 600,000 tons. Approximate analyses of the ores were as follows:

Fe	60.0%
S	4.5%
P	0.7%
H_2O	7.0%
Ore reserve	8,000,000 tons

Insular Mine Operators, Inc.

2. Insular Mine Operators, Inc. at Paracale, Camarines Norte, Luzon, has an annual production of 200,000 tons and ore reserve of 2,000,000 tons of 62% Fe.
   Approximate analyses:

Fe	60.0%
S	0.7%
P	0.3%
H_2O	6.0%

Gold Star Mining Co.

3. Gold Star Mining Co., Marinduque Island:

Estimated ore reserves	6,000,000 tons
Capacity	300,000 tons/yr.

Approximate analyses:

Fe	61.0%
S	0.6%
P	0.3%
H_2O	6.0%

4. Samar Mining Co., Inc., Samar:

Estimated ore reserves	4,000,000 tons
Annual capacity	400,000 tons

Samar Mining Co., Inc.

5. Mati Iron Mines, Davao, Mindanao:
This small deposit is located about 50 kilometers southeast of Davao. It was drilled in 1940, and about 1,000,000 tons were blocked out.

Mati Iron Mines, Davao

Approximate analyses:

Fe	60.0%
S	2.5%
P	0.4%
H_2O	6.0%

6. Angat Iron Mines, Bulacan, Luzon:
This iron deposit has been worked for close to three centuries, using small charcoal furnaces. There are approximately 1,000,000 tons of 60 per cent iron ore.

Angat Iron Mines, Bulacan

7. Surigao Iron Mines, Mindanao:
This iron ore deposit and ore reserve of approximately 1,000,000,000 tons at 47.76 per cent is still awaiting development. It will be discussed at length in a later section of this report under "Metal Industries."

Surigao Iron Mines, Mindanao

Southern Luzon is an important center for iron ore, the mines in Camarines Norte producing over 700,000 tons, or 59 per cent of total Philippine output in 1940. All the other important iron deposits are outside Luzon.

Japan's active buying of raw materials, beginning in 1932, stimulated interest in Philippine iron-ore deposits. The long haul and high freight rates across the Pacific precluded shipment of iron to the United States, while Japan's proximity and accelerated demand provided a convenient outlet for the total Philippine production of approximately 1,000,000 tons annually. A severe shipping shortage is believed to have hampered maximum shipment of iron ore to Japan during the war.

Efforts by both private and Government entities have been made to exploit other minerals, such as asbestos, petroleum, and asphaltum, but only moderate success has so far been achieved owing to lack of the proper equipment.

Asbestos

Asbestos, although abundant, is relatively untouched. The best known deposit to date is located near Bangui in Ilocos Norte. It occurs in veins and pockets and has been classified as amphibole, containing the minerals tremolite and actinolite commonly associated with serpentine. The asbestos fibers run parallel and in some cases transverse to the vein. The asbestos occurs as small pockets in shear and fault zones.

Chrome

A single province, Zambales, on the mountainous western coast, was responsible in 1940 for 95 per cent of Philippine chrome production. Discovered only in 1922, the chrome reserves are thought to be among the largest in the world. Two American companies were responsible for most of the production, although several smaller concerns were in operation before the war, and the Philippine Government held three reservations in the province. The United States is the market for the major portion of Philippine chromite.

According to Charles A. Mitke, Mining Engineer, in an article appearing in the Philippine Mining News, October, 1940, chromite ore has already been blocked out on a large scale; one deposit containing about 10,000,000 tons, while exploratory work is being done on a number of others. In the large deposit, the chromium oxide amounts to 35%, iron 12%; aluminum oxide, a by-product, amounts to approximately 30%. With the tremendous present demand for aluminum it is reasonable to believe, Mr. Mitke states, that some method of extracting this metal will be worked out in the comparatively near future. If the above estimates are correct, it would appear that there are approximately 3,000,000 tons of aluminum oxide in this deposit.

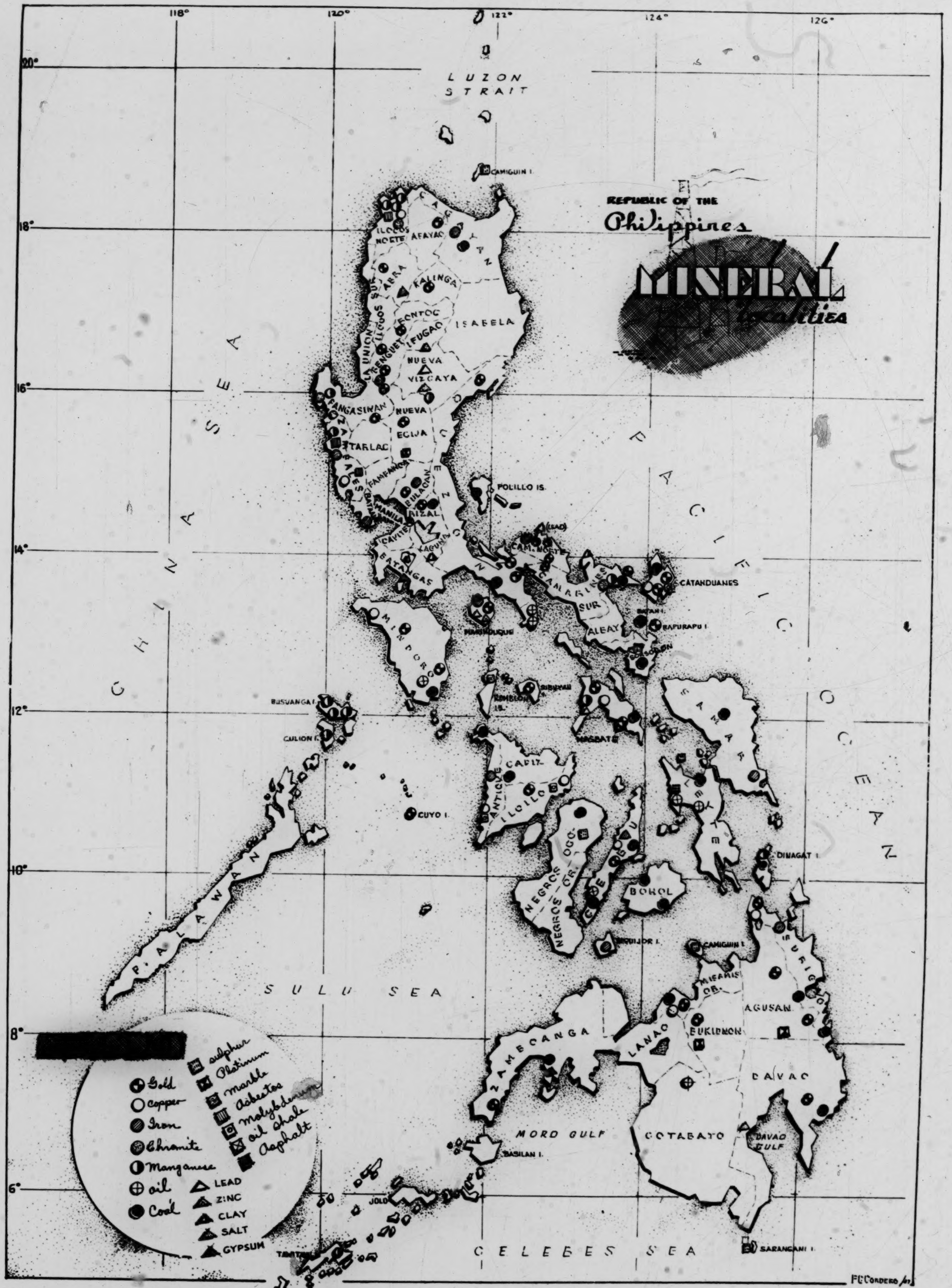
It is understood that experimental metallurgical processes have been developed for the extraction of aluminum from aluminous chrome ores. However, according to available information up to the present moment no actual commercial operation utilizing these processes is known to exist.

Lead and Zinc

It is reported that lead and zinc in the form of galena, bauxite, and tin are to be found in the Archipelago, but no official verification has as yet been made. Heretofore, silver, lead and zinc have been unimportant by-products in the gold and copper concentrates.

Tin

Regarding tin, according to reports which are now available, cassiterite placer deposits are believed to exist in Palawan but there is no exact information as to commercial quantities at the present date.


REPUBLIC OF THE
Philippines
MINERAL
localities
118°
120°
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10°
8°
6°
LUZON STRAIT
CAMIGUIN I.
PACIFIC OCEAN
CHINA SEA
SULU SEA
CELEBES SEA
MORO GULF
DAVAO GULF
ILOCOS NORTE
CAGAYAN
APAYAO
ABRA
KALINGA
ILOCOS SUR
BONTOC
IFUGAO
ISABELA
LA UNION
BENGUET
NUEVA VIZCAYA
PANGASINAN
NUEVA ECIJA
TARLAC
ZAMBALES
PAMPANGA
BULACAN
BATAAN
MANILA
RIZAL
CAVITE
LAGUNA
BATANGAS
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POLILLO IS.
CAM. NORTE
CAMARINES SUR
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SORSOGON
CATANDUANES
BATAN I.
RAPURAPU I.
MARINDUQUE
MINDORO
SIBUYAN
ROMBLON IS.
MASBATE
BUSUANGA I.
CULION I.
CUYO I.
PALAWAN
CAPIZ
ANTIQUE
ILOILO
SAMAR
LEYTE
CEBU
BOHOL
NEGROS OCC.
NEGROS OR.
SIQUIJOR I.
DINAGAT I.
CAMIGUIN I.
SURIGAO
MISAMIS OR.
BUKIDNON
AGUSAN
LANAO
ZAMBOANGA
DAVAO
COTABATO
BASILAN I.
JOLO
TAWI TAWI
SARANGANI I.
Gold
copper
Iron
Chromite
Manganese
oil
Coal
sulphur
Platinum
marble
Asbestos
molybdenum
oil shale
Asphalt
LEAD
ZINC
CLAY
SALT
GYPSUM
F.C. CORDERO

Turning now to fuel minerals, it is important to note that coal is found in practically all of the larger islands of the Archipelago. At present, the main commercial output is centered in the following districts:

Coal

1. Polillo Island
2. Batan Island
3. Sibuguey, Malangas, Mindanao.
4. Uling, Cebu
5. Cahumahumayan, Cebu
6. Cataringan, Masbate
7. Sugod Bay, Sorsogon, Luzon
8. Bulalacao, Mindoro
9. Semirara Island, south of Mindoro.

The BTU of this coal varies from 8,000 to 14,000. Estimated reserves are computed as being from 25,000,000 tons to 45,000,000 tons.

Coal bearing formations

The coal bearing formations in the islands are of Tertiary age and for the most part belong to the Miocene period. The coal basins are comparatively small and discontinuous and of irregular outline. This is to be expected because of the peninsula and archipelagic conditions which existed during the coal forming period. The seams are generally faulted, folded and sometimes are intruded by volcanic igneous rocks.

In view of the extreme need of the Philippines for fuel and power in connection with proposed Philippine industries, the Government should encourage the exploration and development of prospective coal fields. Simultaneously, a research of coal carbonization should be undertaken. The sum of ₱1,000,000 per year is recommended.

Mineral oil

So far no mineral oil in any commercial quantity has been produced in the Philippines, but it possesses certain areas with an oil possibility.

The following regions have been surveyed geologically for oil possibilities:

Regions surveyed for oil possibilities

1. Bondoc Peninsula and the Cagayan River Valley, both in Luzon.
2. Central and south-eastern Luzon.
3. The islands of Panay, Negros, Cebu, Bohol, Masbate, Ticao, Burias, Leyte and Samar.
4. The coastal areas of Mindanao and the Sulu Archipelago.

Asphalt and Bitumens

Natural asphalt and bitumens are found in the extreme northwestern part of Leyte in the vicinity of the town of Vallaba. The deposit has been variously estimated to contain between 2,000,000 and 10,000,000 metric tons.

The asphaltic material occurs as impregnations of sandstones, limestones, and clay tuff and appears to be residue of petroleum, after its lighter constituents had been volatilized. It occurs also in distinct fissure veins in clay tuffs.

Known sulphur deposits

The known sulphur deposits of the Philippines are small. Nevertheless, the ore reserves are rated as follows:

1. Camiguin Island, Cagayan Province—4,1000 tons of commercial sulphur in sight. Analysis: S—81.6 per cent; As—trace; Se—None; Occurrence: Solfataric (irregular both in extent and depth).
2. Burawan, Leyte Province—3,000 tons. Occurrence: Solfataric.
3. Biliran Island, Leyte Province—400 tons. Occurrence: Solfataric.
4. Mount Silay, Occ. Negros—300 tons. Occurrence: Solfataric.
5. Mount Apo, at about 1,400 meters elevation—500 to 1,000 tons. Occurrence: Solfataric.
6. Balut Island, Davao Province—No estimate.
7. Lubuagan, Mt. Province—1,000 to 1,500 tons.

Gypsum

Gypsum is also found to occur in the country but there has been little or no production owing to the fact that known deposits of this material occur in low grade lenses of sporadic quantity and are in most cases pyritic, which does not warrant extensive development. In its present form it can only be useful by mixing with imported gypsum.

Some gypsum is also known to exist in Batangas, Camarines Sur, Cebu, and Leyte.

Salt

The Filipino relies on the age-old method of evaporation of sea water for his salt and production is entirely confined to those areas that have a well-defined wet and dry season. No salt dome or bedded salt deposits have as yet been located in the Philippines.

Lime

Another important local production is that of lime, which is mainly quarried. A small quantity, however, is also produced from the burning of marine shells. This latter method is well-developed in Malabon, Navotas, and other areas near Manila Bay where oyster and marine shells can be found in abundance.

There are also many localities that are known to contain Portland Cement raw materials, but the only plant that is operating at present is in Cebu. With the progress of the reconstruction program it will be necessary that more deposits of this kind be located to supply the proposed cement factories. The present productive capacity of Cebu Portland Cement will not adequately meet present and future demands but the plant is known to be increasing its capacity.

Portland Cement

Guano deposits occur in Tanauan, Leyte; Mabini, Bohol; Capiz, Panay; Zambales, Luzon; Palawan; Camarines Sur and in small quantities in numerous other localities. The deposits occur principally in caves. Production of guano might be increased by the encouragement of a proper development program. Commercial deposits are as yet unknown.

Guano

Clays, suitable for use in the manufacture of pottery, earthenware, and common bricks, are also to be found in many places in the archipelago. These deposits are common but they are not extensive and the clay is generally of inferior quality.

Clays

Stones adaptable for building purposes are widely distributed throughout the numerous islands. One of the principal building stones is commonly called the "adobe" stone. Adobe stone can be obtained in abundance from Rizal and Laguna provinces, Luzon.

Adobe stone

The Romblon marble deposit is the most important ornamental stone deposit in the Philippines. This marble is capable of taking a high polish whereby translucence can be emphasized to meet commercial standards similar to that of the marble produced in Italy. The development of Romblon marble deposit and the construction of a processing plant will ease the present demand, hence reducing the importation of ornamental stones to the Philippines.

Romblon marble

Other potential sources of marble occur at Siramag, Camarines Sur; at Teresa, Rizal province; and on the island of Marinduque.

Turning now to the field of agriculture, it is found that the agricultural potential of this tropical archipelago is even more important than the mineral resources. It is interesting to note that the agricultural potentialities of the Philippines are so vast that an additional population of 80,000,000 more people could easily be provided for.

Vast agricultural potentialities

The most important agricultural food product is rice, which is the staple article of diet. To a lesser degree, and more recently, corn has come into general favor. As late as 1926 neither rice nor corn was produced in quantities sufficient to meet the needs of the people. Much of the rice was imported, partly because there was

Rice

an apparent economic advantage to the Filipino in raising more profitable crops such as hemp, copra, sugar, and tobacco. These islands are the only region in the world extensively planted to produce abaca, known as "Manila" hemp, which is a superior product for marine cordage and other purposes requiring an especially long, strong, durable fiber. Maguey, sisal, and other fibers are also produced for local use and to an appreciable extent for export. The fibers of various other plants, including cotton and pineapple, are used for the manufacture of fabrics for local use. Pina cloth, made from the pineapple fiber, is used for those exquisite embroideries for which the Philippines is famous, but which are not produced for export in quantities comparable with the commercial embroideries on imported cotton and linen fabrics.

Piña Cloth

There is also a great future for the ramie industry in the Republic. This is reportedly the strongest known fiber in the world today. It is soft, lustrous, silky and pure white. Its tensile strength is about three times that of hemp and more than eight times that of cotton, almost eight times that of silk, and four times that of flax. During the war, ramie was used extensively and now, with the amazing strength of this new fiber being taken into consideration, it is felt that the prospects are excellent for attracting foreign capital. Several commercial establishments abroad have already inquired as to the prospects of this new industry.

Ramie

Paradoxically enough, tobacco, once the chief source of direct revenue to the Philippine government and the greatest employer of labor, has now fallen on hard times. Before the war tobacco ranked fourth in the Philippine export trade and the nation was the seventh among the world's tobacco-producing countries, supplying tobacco products to no less than 44 other lands. Excessive specific taxes imposed upon cigars and cigarettes have had such an adverse effect on the entire industry that at the present time we have the paradox of American cigarettes being sold cheaper on the local market than the Philippine products themselves. War damage to plants, fields, and equipment has cut down production and the increased consumption of imported cigarettes may be attributed to the insufficiency of local supply.

Tobacco

Prior to the war, the Philippines was the world's leading exporter of coconut products, controlling about one third of the world copra trade. There was little destruction of coconut trees during the hostilities but the productive capacity of plants producing coconut products (coconut oil, copra cake, vegetable lard, and desic-

Coconut products

cated coconut) suffered severe damage. The pre-war productions capacity of coconut oil was about 240,000 tons but the actual production ranged around the 200,000 ton mark, of which 16,000 tons were exported. Coconut cake and meal production stood at 140,000 tons, of which 100,000 tons were exported Desiccated coconut, which has now attained a position of major importance in the export trade of the Republic, has made rapid strides in rehabilitation during this past year. It is interesting to note that in 1938 export figures for this commodity stood at 34,277,441 kilos at a total of ₱7,632,715, practically the entire portion of this amount going to the United States. Meanwhile, the production of vegetable lard was in the region of 12,000 tons, of which roughly 5,000 tons were exported. Pre-war exports of copra averaged 330,000 tons, which in 1946 had already increased to 600,000 tons.

Pre-war production capacity of coconut oil

Sugar is another commodity which appears to have a bright future. Prior to the war, sugar and sugar products led the list of Philippine export commodities on the basis of monetary value, exceeding by a considerable margin that of mining products. At the present time, sugar is the only item readily exportable at record peace time prices, mainly because the world has been short of sugar for nearly seven years and consequently there is an excess demand. The total prewar investment in the sugar industry is estimated at ₱610,000,000, exclusive of land. War damages, based on present replacement costs, are considerable. An estimated ₱270,000,000 will be required for the rehabilitation of the industry, ₱150,000,000 of which will be required for plantations, plantation buildings, agricultural machinery and fertilizer while ₱120,000,000 will be needed for the replacement of milling and refining machinery, buildings and equipment. Prior to the war there were 43 sugar centrals in operation. At the present time there are 15 in actual operation and an additional five are expected to resume operations before the end of this season. On this basis, local sugar economists estimate that the Philippines will be able to export 280,000 tons of sugar during the 1947-1948 season.

Bright future for sugar

In view of the fact that the best prewar crop was 1,500,000 tons, it may be said that rehabilitation of the industry has been remarkable, especially when one considers the extent of the war damages, the dissention that has existed between labor, planters, and refiners, the fact that no war damages have yet been paid, the inflationary trend, the lack of financial assistance in addition to the difficulty

Rehabilitation of industry has been remarkable encountered in securing construction materials, machinery and equipment.

Rubber

A newcomer to the agricultural field is the production of plantation rubber. This has been carried on to a degree which indicates that it can be commercially profitable. So far, this has been the result of private ventures by foreigners. After several years of commercial production, these small plantations have demonstrated that conditions of the Philippine climate, soil and labor are eminently favorable to rubber production.

Attention now sharply focused on rubber

The easing of manufacturing controls in the United States with respect to raw rubber sharply focuses attention on this once thriving Asian industry. America was undoubtedly the world's leading consumer of natural rubber during the pre-war trade era but during the war consumption of natural rubber dropped from practically 100 per cent to 10 per cent of normal use. With the increase of synthetic rubber production, the natural variety was relegated to an obscure place in American economy. The present policy now permits unlimited use of natural rubber for many products, which essentially will afford a market for approximately two-thirds of the former trade, or 640,000 to 700,000 metric tons.

Varying problems

Rubber growers in the Far East have been beset by varying problems. Prices dropped after a free market had been established and wage demands, costs and other factors have generally hampered full and profitable production from trees rested throughout the last five years.

Existing laws prohibit any large grants

The modest entry of the Philippines into rubber production for export can be indicated by the 1946 reports that 543,837 kilos valued at ₱528,507 was sold in the open market. However, this valuation establishes a unit cost per pound at 48 centavos which does not approach the average Malayan price ranging between 32 to 45 centavos per pound C.I.F. New York for number one smoked sheet. The elements for successful and competitive production of natural rubber in the country do not hinge on climate, soil or technical knowledge of operations but rather on the fact that existing laws prohibit extensive grants to any group or entities thus limiting large scale operations required for lower unit cost and amortization of investment on a perennial agricultural crop such as rubber. Information reveals that prior to the last war, an American firm was definitely interested in developing the industry locally but negotiations lagged and the prospective investor withdrew the offer. With the announced policy of the United States of stepping up her strategic reserve of raw rubber, the present center of production in the Philippines, chiefly Basilan Island, may experience expansion if price can compete with other production nations of this vital material and whether some incentive would be provided for scientific development by a private group utilizing the most modern method of processing.

Opportunity seen for P. I. rubber

The entire chain of the Philippine Archipelago, it is claimed, was once entirely covered with forest growth, from the plains at sea level to the highest mountain tops. These forest areas today comprise more than 43,000,000 acres, or nearly 60 per cent of the total land area. They are of great economic value. There are many varieties of the choicest cabinet woods, and of timber well adapted for all kinds of structural and other economic uses; and they produce large quantities of tan barks (cutch), dyewoods, gutta-percha, gum copal, and other valuable gums, resins, oils, rattans, and fibers, and nipa palm, the sap of which is used for the manufacture of alcohol.

Large areas of forest

Philippine hard woods are classified by the Bureau of Forestry according to degree of hardness and there are a number of the first class of a specific gravity greater than water, capable of taking the finest finish, and useful for a variety of structural purposes. About three thousand varieties of wood are distinguishable in the Islands.

Philippine woods

Of this forest area, nearly 90 per cent, or 64,127 square miles, are commercial forests, the balance being classed as second growth capable of furnishing timber of small dimensions and an abundant supply of firewood. Practically all these forests are public domain and are administered by the Philippine Bureau of Forestry, only one per cent being privately owned.

Next in order of importance, comes the raising of livestock which, as an industry and as a sideline, engages perhaps the largest number of people after farming. The domestic animals in the Philippines include carabao (a domesticated form of water buffalo), cows, horses, swine, sheep, goats, and poultry. The carabao is the commonest draught animal and is generally useful. It ploughs the land, hauls the cart to and from the market, supplies milk for the family, and finally is killed for meat. The vast areas of unploughed grassland and abundant water supply from numerous mountain streams offer natural advantages for the cattle industry.

Raising of livestock

The waters of the Philippines teem with a rich variety of fish, estimated at some 2,000 species. Fishing ranks next to farming and livestock raising in point of usefulness, value and the number

Rich variety of fish

of people engaged in it. Fish, after rice, is the most important element in the Filipino diet.

Pearl fishing

Pearl fishing is carried on by Sulu fishermen around the islands of Capual, Calupag, Tambilaongan, and Pasigan in the Sulu Islands and around Dumaran island in northern Palawan, where the best pearl beds are found. Tuna fishing and canning also offer export possibilities.

Progress in rehabilitation

Having given a cursory glance to the national mineral and agricultural resources, it will be interesting now to turn to the economic field for a moment. Philippine rehabilitation has proceeded slowly but surely since the war's end. Throughout 1945 inadequate transportation facilities (both land and water), difficulties in obtaining materials and equipment, inflation, and high wages all combined to impede progress, while agrarian unrest contributed still further to the retarding influences existent in the main centers. For many months after the first landings on Leyte on October 20, 1944, military operations precluded the revival of anything approaching normal production, while following V-J Day, September 2, 1945, danger from Japanese irregulars hiding and fighting in many of the areas interfered with the resumption of peace time pursuits, even with the limited facilities available.

By the middle of 1945, the cost of living in Manila had risen to approximately eight and a half times the pre-war level, and at the close of that year it was still about four and a half times higher than before the war. Wages of four to five times pre-war rates added to the difficulties of rehabilitating industry, and the revival of manufacturing activity was negligible. Moreover, no attempt was made to inaugurate a construction program. Businessmen were hampered by lack of transportation and inadequate communication services. Furthermore, it was not until the second half of the year that banking facilities were available.

Limited revenue

The status of transfers of property and the repayment of prewar obligations during the Japanese occupation was not officially settled, nor was the problem of redemption of outstanding guerilla currency solved. Taxation yielded but limited revenue. No measures were designed to increase taxation, and finally, agricultural output was extremely limited, and there was no production of gold or base metals in 1945.

Steps were soon taken by the United States and Philippine Governments to assist in the procurement of Philippine produce—especially strategic raw materials—and to facilitate the re-establishment of private trade between the United States and the Republic.

The very heavy orders placed in the United States toward the close of 1945 were reflected in exports to the Philippines in January, 1946, which attained the value of ₱60,000,000, half of which represented foodstuffs and textiles. It was hoped that, as more goods became available, prices would steadily decline, and living costs and wage levels would show a downward tendency. This, however, has not yet been fully realized. Prices are definitely on the decline but they have not as yet reached anywhere near the pre-war level. Nevertheless, the decline in living costs, although slow, is steady and this is one of the most encouraging factors in the economic picture today.

Prices now declining

Meanwhile, the work of rehabilitation is progressing at a rate unequalled by any other country in the entire Far East. After a slow start, the Filipino people are now getting their feet firmly placed on the road to recovery and it is an actual fact, as was pointed out by President Manuel A. Roxas in his Independence Day speech on July 4, 1947, that the Philippines has shown more progress in one year of independence than did the United States in twenty years.

Road to recovery

Manila, the capital city of the Philippines, may never have a better opportunity to rebuild. It may now build bridges at different locations, widen streets, erect buildings on new sites, change the layout of streets and avenues almost at will. The city's extensive destruction, followed by its subsequent liberation, has facilitated the formulation of well-considered plans which take into account the requirements of business, industry, and government, besides providing better living conditions for the city's population.

Opportunity to rebuild Manila

Manila's new commercial center may rise out of the old slum districts of Binondo, San Nicolas, and Tondo, all located north of the Pasig River near the metropolitan area. Quezon City, northeast of the metropolitan district, will probably be used as the Government Center, as was planned several years ago. More modern sewerage and drainage facilities are also being planned for Manila and other major cities of the Republic.

Improvements being planned

The progress of rehabilitation, however, has been seriously retarded by the unsettled labor conditions. Growing labor unrest was the most prominent feature of the past several months and recurring strikes in practically every branch of industry have tied up transportation and communication facilities and impeded industrial rehabilitation as workers constantly demanded higher wages. Labor is still in a state of flux but the picture has brightened considerably

Problem of labor

as intensive efforts have been carried out to smooth labor-management-government relations.

Travel facilities

In addition to labor difficulties, the lack of essential materials has seriously retarded the complete rehabilitation of transportation and communication facilities. Despite these obstacles, however, tremendous strides have been made in providing the traveller and businessman with a fast and efficient system of inter-island travel both by sea and air. There are no less than 96 airstrips dotted around the various islands and a daily air service linking the majority of these points assures the traveller of speedy access to any part of the archipelago. Some of these landing strips are as yet inadequate for the operations of heavy types of aircraft, but their improvement to meet minimum requirements as to length and width of runways is anticipated in the near future. As conditions improve, these minimum requirements will be made to approach those prescribed by the United States Civil Aeronautics Administration.

International airport

At present, only two airfields—Makati and Nichols Fields, both in Manila—have lighted runways for night landing, but it is understood that beam control landing equipment will be installed at all major airfields in the near future. An international airport is presently being established at Nichols Field which is the only one that has available beam control equipment for landing purposes.

The latest plans include the establishment of four omni-directional radio ranges which will be sufficient to control the entire aeronautical network of the Islands. These ranges will be set up at Cebu, Manila, Laoag, and Zamboanga. It has been estimated that all this will be accomplished within the next two years—a feat which will put Philippine airlines on an equal footing as regards safety flying conditions with any other nation in the world.

Inter-island shipping

The shortage of inter-island shipping was a serious impediment to the rehabilitation of Philippine economy in the days immediately following liberation. Sea lanes are the main arteries of transportation, but throughout 1945 many of the principal trade centers were without regularly scheduled shipping. This deficiency, on the whole, has now been adequately remedied and there is an ample supply of shipping between the islands. The pre-war port facilities were realistically conceived and executed. In most cases, they were adequate for the pre-war trade and the then prospective commerce. There were 64 national ports and 17 municipal ports, of which the port of Manila was overwhelmingly the most important. The ports were gravely damaged by the war and although some construction and expansion was carried out by the Armed Forces of the United States to satisfy military requirements, this work was only of a temporary nature and there is still a tremendous amount of rebuilding to be done with regard to them. A floating dock for use in Manila harbor has been suggested. When completed, this would be capable of lifting a 10,500 ton vessel, and it has been estimated that the cost of construction will be approximately ₱1,350,000. With this idea in mind shipyards and dry dock equipment have been requested as part of the Japanese reparation.

Floating dock for Manila

With regard to the rail and road transportation, the picture is not quite so reassuring. The north line of the Manila Railroad Company—the only one operating in Luzon—runs as far as San Fernando, La Union Province, a distance of only 266 kilometers. The railway's southbound line from Manila terminates at Ligao, Albay Province, a distance of 445 kilometers. From Ligao there is a bus connection to Legaspi, thirty kilometers away.

Railroads

Of the Philippine Railway Company's two lines in the Visayan Islands—one on Panay and the other on Cebu—neither is operating at the present moment.

The well-developed Philippine highway system also suffered severely from the ravages of modern warfare. Road beds were badly damaged, and in many cases destruction of bridges was too complete for their replacement with wooden spans, thus leaving the condition of the highways generally bad.

Highways

Postal and telegraph services within Manila and between Manila and other cities have now been restored and the capital city's extensive pre-war telephone system is also being sufficiently re-established. The situation has been further relieved by the establishment of airmail services to all points in the islands. Commercial airmail between the Philippines and the United States is now speedy and satisfactory.

Post and telegraph services

Of the more than seven thousand islands which constitute the Philippine Archipelago, two—Luzon and Mindanao—account for 67 per cent of the total land area. Luzon, with its 40,410 square miles and 7,375,000 inhabitants, or 46 per cent of the Filipino people is larger and considerably more densely populated than Mindanao. It contains more than 50 per cent of the Philippine highways, or 7,200 miles of roads, and all but 132 of the country's 840 miles of railroads.

Luzon

Ancient migrants from the great Malay regions of southern Asia, moving in waves into the north and east, sought new homes in the fertile valleys of the impressive chain of islands which extends from Borneo almost to China's coast. In 1570, from his settlement on Panay Island, Legaspi, who had been sent by the King of Spain to prepare the way for colonizing the Philippines, heard of a prosperous Moro (Mohammedan) town in the north, "Maynila", and promptly sent an emissary to capture it. Soon after that Legaspi himself came to the settlement on the south bank of the Pasig River and subdued the Kingdom of Tondo on the river's north bank.

History of Manila

In 1574, the King of Spain proclaimed Manila the "Distinguished and Ever Loyal City" and Luzon the "New Kingdom of Castilla." In the 19th century American businessmen were not unaware of Manila's trade possibilities. Clipper ships, engaged in business with China, made the city in Luzon a port of call, and two American firms established commercial relations which lasted until after the American Civil War. More than a hundred years later, in 1935, clipper ships of a vastly different era—Pan American's giant seaplanes—also made Manila a port of call.

As Manila grew in commercial significance the island of Luzon gained importance in the country's slowly developing economic life. Possibly the most richly endowed of the amazingly rich islands that Spain was destined to rule for more than three centuries, Luzon is of varied topography, with elevations ranging from a foot or two above sea level to mountain summits over 7,000 feet high.

Commercial significance of Luzon

In the north a broad valley, bounded on east and west by mountain ranges, extends more than 120 miles. Flowing northward through this region, the Cagayan, largest river in the Philippines, drains with its tributaries an area of approximately 10,000 square miles. Native bancas still ply the river's swift current, but much of the Cagayan's ancient importance as a means of transportation for products of northern Luzon has been lost, as highway routes now parallel the river's course, connecting with the northern terminus of the Manila Railroad.

Largest river in Philippines

West of the valley sprawls Mountain Province, from which comes most of Philippine gold and, more recently, copper. In this largest province in Luzon live the greatest percentage of non-Christian Filipinos — Igorots, Ifugaos, and Kalingas — who have stubbornly resisted the inroads of Christianity. Leaving the lowlands to adherents of the new faith, they clung tenaciously to their mountain communities, where, long before the Spaniards came, Igorots were bartering gold nuggets for less valuable wares.

Non-Christian Filipinos in Luzon

Luzon's central plain, extending north from Manila Bay to the China Sea and surrounded by mountain ranges, is drained by the Pampanga and Agno Rivers. The former flows south into Manila Bay, while the Agno runs north into Lingayen Gulf, scene of early Japanese invasions in 1941.

Rice granary

The area of the plain is approximately 4,000 square miles, although a considerably greater area is drained by the two rivers and their tributaries. This, the "rice granary" of the Philippines, is the chief population center in Luzon.

Although rice is grown in every province in the Philippines, approximately 40 per cent of the total crop comes from Luzon's central plain, and the island as a whole supplied around 65 per cent of the annual rice yield before the war. The chief food of Filipinos for many generations, rice forms the staple diet of some 11,000,000 to 12,000,000 people, or approximately 75 per cent of the total population. Locally grown corn is preferred by natives of the Visayan group and of northern Mindanao. Although wheat flour was a leading import before the war, consumption of bread products was confined to Manila and other urban centers.

Sugar areas

Principal Philippine sugar areas are in the Visayan group, but in central Luzon, especially Pampanga and Tarlac provinces, were some important plantations and sugar centrals before the war. Of the total acreage in sugar in 1938, Luzon as a whole accounted for 39 per cent.

Cagayan province

In the north of Luzon, the province of Cagayan, which occupies the lower basin of the Cagayan River, is worthy of attention. Its eastern coast is high and mountainous, but its northern shore, bordering on the north China sea, is low and swampy. This northern area has been built up by the deltas of the Cagayan and Abulug Rivers. Between the mountains are large valleys fertilized by alluvial soil that is deposited by the rivers every year.

Vast potential of power

Northern Cagayan, which is low and exposed to the sea breezes, is adapted to rice but not to tobacco as in the south. Rainfall is abundant with the coming of the northeast monsoon. The tobacco-producing region occupies the whole of the valley that is watered by the Chico River. There is a vast potential of power in this region with regard to the hydro possibilities that can be developed from the Chico River. So promising are these hydro possibilities that the Chico River valley is considered to be second in importance only to the Maria Cristina Falls in the Lanao area of Mindanao.

Besides tobacco and rice, coconuts are grown and corn is culti-

Extensive forests

vated. There are also vast sugar areas here. The nipa swamps do not, however, constitute an important source of revenue as happens in Bulacan and Pampanga. The forests are extensive and contain much hard wood, but lack of transportation prevents their exploitation.

In the vicinity of Mount Maguipit copper is to be found, while near Mount Cagua there are veins of coal. Except in the tobacco and rice regions, the occupation of the people is chiefly that of trading. Rafts and bancas are sent up the Cagayan River for tobacco that is gathered and stored in the warehouses of Aparri, where boats from Manila call once a week. Along the coast the fishing industry attains considerable importance.

Mindanao

A thousand miles to the south of Luzon, but almost connected with it by an unbroken chain of thickly clustered islands, lies Mindanao, second in importance only to Luzon.

Larger in land area than the State of Maine, Mindanao's 36,540 square miles, comprising more than one fifth of the total area of the Philippine Archipelago, form such an irregular configuration that its coast line, indented by many inlets and deep bays, totals 1,590 miles. Iligan Bay on the north and Illana Bay on the south, with less than ten miles of land between them, nearly sever the great Zamboanga Peninsula from the main island.

Mindanao, however, contains but nine of the 49 Philippine provinces. Its two smallest provinces, Misamis Occidental and Misamis Oriental, form most of the northern coast. To the east are Agusan and Surigao. Lanao, with the large lake of the same name in the center, and Bukidnon are in central Mindanao, while the two largest provinces in the Philippines, Cotabato and Davao, comprise the southern half of the island. In splendid isolation Zamboanga province juts out far to the west and south.

Richness of soil

Mindanao is comparable to Java in richness of soil and variety of tropical vegetation, but Java is one of the most densely populated and intensively cultivated regions in the world, whereas only about ten per cent of the total land area of Mindanao is cultivated. Considerable portions of the three largest provinces—Cotabato, Davao and Zamboanga—remain comparatively unexplored.

On the other hand, some of the more modern agricultural developments in the Philippines, such as the abaca and pineapple plantations of Davao and Bukidnon, are in this new country to the south of Luzon. Moreover, Mindanao's two large river valleys contain the most extensive potential agricultural land in the Philippines. The

Agusan River rises in Davao Province, flowing north through Agusan Province into Butuan Bay and the rich Cotabato valley which lies to the south. Drained by the Rio Grande de Mindanao, which empties into Illana, this valley contains approximately 18,000 square miles. Extensive swamps are present in both areas, but these waste lands are partially utilized for the cultivation of lowland rice. The swamps contract to well-defined lakes in dry weather and in the wet season flood vast areas.

Rich potential agricultural terrain

Climatically, Mindanao is more favorably situated than the islands to the north. Except for a portion of Surigao Province, in the northeast corner, it is below the typhoon belt and rainfall on the whole is more equally distributed than in Luzon or the central Visayan Islands. There is no protracted dry season, as prevails for about half the year in much of Luzon, and a pronounced maximum rain period exists only in the eastern section of Mindanao.

Climate

Differences in temperature are slight throughout the Philippines. The mean annual temperature at four observation stations in Mindanao ranged from 79.8° to 81.6° F., as compared with 80.2° F. at Manila.

Temperature

The virgin soil of Mindanao is exceedingly fertile, and the vegetation is luxuriant. Forests, thickly interwoven with canes and vines, abound with valuable building timber and cabinet woods.

Though limited in extent, Mindanao's cultivated area yields a wide variety of agricultural products, including tropical fruits and the plants and grains of temperate zones. Coconuts, rice, corn, and abaca constituted the leading crops before the war, accounting for about 85 per cent of the cultivated area in 1938.

Leading crops

Mindanao accounts for about one sixth of the total coconut acreage in the Philippines, and copra, or dried coconut meat, is one of the leading exports. Two of the country's nine desiccated-coconut factories were in the island before the war—an American company in Zamboanga city and a Japanese plant in Davao city.

Rice, the second crop, is grown mainly in the principal Moro provinces of Cotabato and Lanao, and Mindanao accounts for about a tenth of Philippine production. Indian corn—imported from America by the early Spanish Friars—subsequently supplanted rice as the leading article of diet for Filipinos living in northern Mindanao. Corn is raised chiefly in Misamis Occidental and Oriental, Lanao, and Zamboanga.

Indian corn

One of the localities in the Philippines best suited for the cultivation of abaca is Davao Province in Southern Mindanao. Under the impetus of scientific methods employed in the Davao plantations, production increased steadily, whereas abaca cultivation and production in Luzon showed a tendency to decline.

Mineral resources in Mindanao

Mineral resources of Mindanao are known to include iron, coal, gold, and copper, and possibly oil. The most extensive iron deposits in the nation are those in Surigao province, where the reserves have been variously estimated at between 500,000,000 and 1,000,000,000 tons. This region will be discussed extensively in a later portion of this report, beginning on page 89.

Coal, copper gold

Coal deposits of commercial importance are known to exist elsewhere in Mindanao, and several gold mines and one copper were in operation before the war. Sites chosen by the Government for petroleum surveys included one in Cotabato province.

With its expanse of fertile soil, forest resources and mineral reserves, Mindanao has a rich undeveloped potential.

Today the Philippines stands at the cross-roads.

It lies within its grasp to rise to a new peak of prosperity and become once again a leading country in the Orient, a vital hub of Pacific trade. There is, however, a conditional factor that must be recognized and absorbed before the final fulfillment of this picture.

The undeniable potential of this young nation has been indexed and the path to prosperity has been carefully mapped in the following pages. But direction alone is not enough. There must be the underlying labor to make the results possible.

Essential lesson

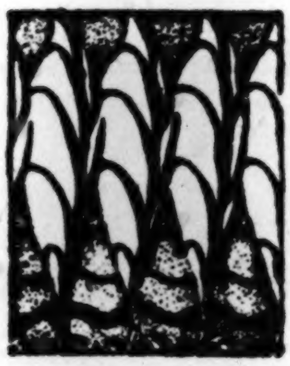
That is the essential lesson that must be brought home forcefully to the Filipino people themselves and to the pioneers from abroad who come here to help in the industrialization of these islands. Great new projects are being planned for the expansion of the Philippines, but without the actual manual support of the people of the nation in the very first place nothing can be achieved.

The task of restoring the Philippines to productivity offers attractive business opportunities and commercial possibilities. The country is in pressing need of every form of agricultural and industrial machinery and equipment, but it offers in return ample reward in the profits that can accrue from enterprising new business projects.

It was the country's business, economic, and political life radiating from Manila, however, that attracted Americans during the forty odd years prior to the Japanese invasion.

The path has been adequately sign-posted. It is frankly admitted that the program contained in the following pages is not entirely complete. Not everything contained in this proposed program is an immediate essential but the plan is a long range one and has been pointed out for the gradual development of this nation. All the necessary ingredients have been included.

Now it is up to the people of the Philippines and outside capital to decide whether or not the final objective of the Republic shall be attained.



ECONOMICS

Economic Vista

THE BASIC FOUNDATION for the economic development of the Republic has been clearly indicated in the preceding pages. There can be no denying that history and geography have combined to endow the Philippines with a rich abundance of materials strategically located for expansion and trade. The country is rich materially and spiritually. All the ingredients necessary for economic prosperity are to be found within this compact Archipelago. It is on the successful development of these resources in the immediate future that the economic salvation of the nation depends.

The report submitted in the following pages is formulated as briefly as possible for obvious reasons. The main purpose and intention is to glance over the possibilities and to present the main essentials of a program designed to promote a planned recovery and economy for the Republic.

The impossibility of making a detailed and complete survey of any national economy in such a short period is fully and clearly recognized. At the same time, however, it is felt there is urgent need for an overall program projected into the future, that will establish a general outline for the industrialization and development of the Philippines. It is more than obvious that any such scheme will have to be flexible in the extreme in order that it may readily be adapted to fit into the shifting kaleidoscope of world conditions wherein the entire situation is constantly changing not only from year to year and month to month, but even from day to day, in the troubled vortex of political metamorphosis. It is believed that once the general plan has been envisioned and the foundation for industrialization has been laid, a more practical and detailed study of each individual industry can be made, in order to adapt its proper application to the particular conditions and needs existing at the moment. Only thus can the full potential of the nation be efficiently developed and expanded.

Constantly changing conditions

The proposed program, which encompasses a period of up to fifteen years, is necessarily a complex one owing to the many phases which must enter into any overall problem. It must be emphasized, however, that this plan of development is in the form of a suggestion and is not in any way to be taken as a statement of policy.

Suggestion, not statement of policy

The main factor to be taken into consideration in any assessment of the overall economic situation in the Philippines is the fact that prior to the war the country was predominantly agricultural. Up to 1938, over two-thirds of the gainful workers employed in the Islands were in the agricultural brackets, while agricultural products, either raw or processed, provided three-fourths of the country's exports. Exports in the form of sugar, coconut products, tobacco and hemp were more than sufficient to offset imports and leave a favorable balance of trade. The big market was the United States, where favored conditions of import had been established in order to foster Philippine development. Imports, on the whole, tended to adjust themselves to the level of exports and other foreign exchange receipts, although a favorable balance was maintained.

Main factor for consideration

Foreigners held substantial investments, owning about one-fourth of the national wealth, according to the 1938 census. The following is a record of all commercial establishments in that year, listed by citizenship of the investors:

Investments in 1938

Citizenship of Investors	*Pesos*
P. I.	203,598,865
U. S.	120,961,537
China	149,476,830
Japan	23,005,956
Spain	5,326,572
India	1,004,876
Great Britain & Australia	55,196,800
Switzerland	2,828,959
Holland	53,205
Germany	500,199
Other countries	35,647,426

In comparison with this, the paid-up capital of registered partnership, classified by citizenship of controlling interest in the Philippines after the war is listed as follows:

Registered partnership 1945-1946

JULY 1945 — JUNE 1946

American	22	₱ 729,956	3.76%
British Indian	5	346,000	1.78%
Chinese	216	11,829,306	60.86%
Chinese Hindu	1	10,000	.05%
Filipino	180	4,628,370	23.81%
Fil-American	9	274,500	1.41%
Fil-Austrian	1	4,200	.02%
Fil-Chinese	18	473,500	2.44%
Fil-European	4	110,000	.56%
Fil-Hindu	1	15,000	.08%
Fil-Spanish	1	5,000	.03%
French	1	55,000	.28%
Hindu	6	505,500	2.60%
Spanish	2	313,000	1.62%
Spanish-Chinese	1	10,000	.05%
Swiss	1	50,000	.26%
Others	4	76,000	.39%
Total	473	₱19,437,832	100.00%

It is extremely interesting to note from the above figures that the Chinese controlled 60.86 per cent in 1946 as against 23.81 per cent by the Filipinos and only 3.76 per cent owned by the Americans. The registered partnership figures are also interesting, there being 216 Chinese, 180 Filipino and only 22 American partnerships.

As against this, it must be taken into consideration that the Americans invested chiefly in mining operations, as is shown in the following listing:

TOTAL ASSETS OF ALL MINING COMPANIES—1939

Kind of Mine	*Total Assets*	*Distribution*
Gold	₱188,198,999	93.5
Iron	4,411,941	2.2
Chromite	3,635,285	1.8
Manganese	2,435,996	1.1
Copper	2,435,996	1.2
Asbestos & Coal	428,478	0.2
Citizenship of Investors		
P.I.	₱ 93,356,088	48.4
U.S.	74,158,719	36.9
China	3,392,298	1.7
Japan	550,779	0.3
Great Britain	12,101,356	6.0
Spain	6,210,955	3.0
Other countries	7,455,198	3.7

From this it can be seen that the Americans completely dominated this field, coming immediately after the Filipinos with 36.9 per cent of the distribution, Great Britain being the nearest competitor with a holding of only six per cent.

Imports kept within reasonable bounds

The effect on Philippine economy of the artificial support of foreign influx, nevertheless, proved a mixed blessing, for the very considerable wealth derived therefrom was not diverted into the domestic economy in order to develop the less spectacularly profitable enterprises. On the other hand, the policy was not entirely disastrous, since the imports were kept within reasonable bounds.

Since the war, however, there has been a radical change in the entire economic setup. To begin with, the nation is now faced with two vital new problems—the necessity for the rehabilitation and reconstruction caused by the war, and, equally serious, the slow but certain loss of special privileges in the American market. Secondly, the path to future prosperity lies in industrialization.

With regard to reconstruction, the Philippine Rehabilitation

Act, the provision of reparations from Japan, the gift of surplus military equipment, the Philippine Trade Act, and other measures provide for financial and technical assistance. Industrialization, once accomplished, will be the means of overriding the second obstacle.

Industrialization constitutes a means by which the nation's purchasing power may be increased through the medium of more employment and higher wages. The transition from a basically agrarian economy to an industrial economy, however, must be accomplished in a reasonable and planned order, or the impact on the present economic structure of the nation may be severe and may produce undesirable effects. The evolution of any industrial nation has always taken place over a period of years. Citing the case of Mexico, that nation today has embarked on a program designed to progress according to the actual basic needs of the country. Mexican national law insists on fifty-one per cent participation by the Government in any and every form of foreign investment in the country. The primary aim behind this stipulation is the safe-guarding of the nation's resources from foreign exploitation.

Transition must be planned

In the Philippines, too, capital industrial ventures established on the promise of quick returns and rapid exploitation will have to be controlled and discouraged as much as possible. To ignore the cardinal fact that the resources of the nation are not inexhaustible, except in certain fields, invites the possibility of over-production today and no production tomorrow. The insular position of the Republic permits no alternative other than the zealous guarding of resources in order to avoid short-lived industrial establishments which would, in time, necessarily revert to outside sources of supplies for the maintenance of such industries.

Over-production today, no production tomorrow

Industrialization is not a simple matter of discussion or conjecture. It is the sober realization of accomplishment with attendant sacrifices and conscientious labor working in accordance with a carefully considered plan.

The industrialization of no country has been accomplished without the aid of the state in one form or another, either as sole industrialist (as in the case of Russia) or as silent partner of private individuals (for example, America). Russia and the United States are ideological opposites,—Communism as opposed to Democracy. The proposed program for the development of the Philippines contains no trace whatsoever of the Russian formula, being based exclusively along American lines.

Proposed program has no trace of Russian formula

At a time when private capital was retrenching following the 1929-1932 period of depression, the United States Government devaluated the dollar and inaugurated the Reconstruction Finance Corporation and subsidiaries with the aim of providing emergency financing facilities and to aid agriculture, commerce and industry. The R.F.C. has an authorized stock of $25,000,000 and in the last ten years has issued loans amounting to no less than $46,000,000,000, while the authorized capital stock of the Corporation's many subsidiaries amounts to $200,000,000. That was the start of the "silent partner". Today the Government has a finger in every form of economic life throughout America. Government participation in and control of industry is based on a system of Government Corporations, commissions, and companies imbued with limiting powers. Control is exercised entirely through taxation and law. An example of this was the war time excess profit tax on everything above 6 per cent, with the remaining profits being excessively penalized. The primary aim of the United States Government was to safeguard the public welfare, and to stimulate industry with a series of direct financial grants. There are innumerable examples of Government participation in United States industries; for example, there is the Tennessee Valley Authority, the American Railroads (Public Domain Land Grants), U.S. Maritime Commission, the N.R.A., F.H.A., F.E.C., C.A.A., F.D.I.C. and the Commodity Credit Corporation, to mention but a few.

U. S. Government participation in industry

It is obvious that there is not enough private capital in the Philippines today even to think of attempting the tremendous task of reconstruction and industrialization that lies ahead, without aid from the Government and from foreign investment. The solution of the economic problem and the salvation of the country lie in the mutual and cooperative development of industry in a system of capital-government partnership.

Partnership capitalism

This in essence is directly similar to "partnership capitalism" which was suggested by Mr. Eric Johnston, former President of the American Chamber of Commerce in the July edition of the Atlantic Monthly. It is an idea which had already been suggested in the first issue of this report, and which is now being enlarged upon in this revised edition.

Fundamentally, certain policies should be defined by the Government for the purpose of guaranteeing all capital industrial investments. These can briefly be described as follows:

(1) A system of manufacturing licensing.

(2) Import control on commodities which will not contribute to the economic development of the country.

(3) Moderate restrictive measures against the exploitation of raw materials which are irreplaceable.

(4) A method of financing through non-assignable and non-negotiable bond issues for the purpose of bringing home to the citizens their share of responsibility in investing in the economic development of the country. These should be in the form of Government bonds purchasable by the public and there should be some form of guarantee that the bulk of these funds will not be expended on luxuries or consumer goods.

(5) The Government will not enter into direct competition with private industry except when absolutely necessary or when private initiative fails to provide the required needs of the nation.

(6) A clarification of Government participation in respect to financial and equipment needs of private capital in the management and operation of industries.

(7) A clarification of Government withdrawal of its investment after a period of time, leaving private capital to continue operation on its own.

Crucial issues

The last two points are crucial issues which have already aroused controversy through being misinterpreted. It does not mean, as in the case of Mexico, that the Government will step in and take over 51 per cent control of every foreign enterprise that comes into the country. Neither has it any parallel to the existing situation in China. It does mean, however, that the Government will divest itself of its onus in all businesses on one of three counts:

(1) The Government will help private capital inaugurate any business that is feasible.

(2) Failing that, the Government will go into partnership with prospective investors, or

(3) In the event that all other possibilities fall through, the Government will run the business where the need arises.

Primary aim of Government

It is obvious from this that the primary aim of the Government is not to compete or take over control of private investment but to help it whenever possible.

Although there have been numerous misunderstandings and misinterpretations of Government policy, not the least of which is the criticism that the Government is competing in its various enterprises with private interests, it is believed that the policy of the Government is basically sound, workable and definitely in the best interests of the economy of the country and the people as a whole.

In the best interests of the country

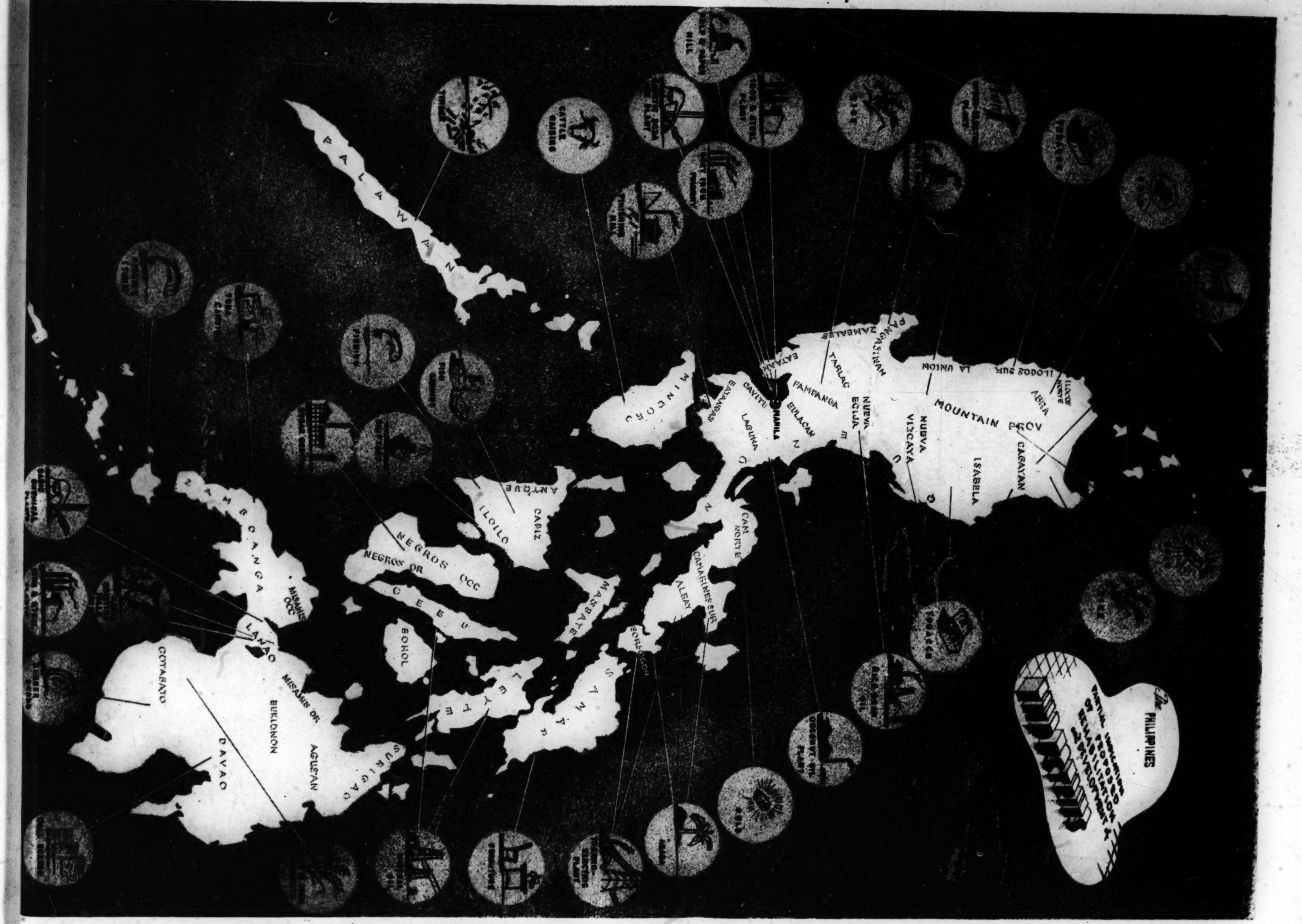
It is felt that the Government does not desire to enter into private industry or to compete against it, but would prefer that private capital and individual initiative and enterprise develop to the full the natural resources and potentialities of the country, unfettered by government regulations or restrictions. However, in the absence of the required amounts of any of these to accelerate the advancement and development of the country, which depends to a great extent upon proper industrialization, the Government should be willing to assist by joining with private interest to any extent necessary in order to advance these aims. Furthermore, in the event that private interest is entirely lacking, then the Government should be willing to accept sole responsibility for the "pioneering" of any particular field until such time as private interests have expressed a desire and have demonstrated their ability to supplant Government enterprise in that field.

To expand upon this suggested policy, and to answer to criticism advanced that the Government wishes to maintain a 51 per cent interest, it is recommended that only in the case where the Government invests more than one half of the capital requirement, either in the form of finances, goods or services, will a controlling interest be expected. A further case in point is that even under these circumstances, it is suggested that the Government should direct that private management, with certain directorship controls, be retained and maintained.

The Government fully realizes its responsibilities to the people, and necessarily thus to the country itself. The development and full exploitation with adequate protection of the natural resources of any country will necessarily benefit the economy of that country and its people as a whole.

Although the Philippine Republic is in a more fortunate financial position than any other country in the Orient and many other countries in the rest of the world, it still has no other alternative but to insure itself against the possibilities of reverting to or continuing a basic agrarian economy. To prevent short-lived investments with their resulting economic impact on the fundamental structure of the nation, the above-mentioned steps are of paramount importance and must be clearly defined in order that an overall

No other alternative


The PHILIPPINES
INDUSTRIES
PARTIAL INDICATIONS OF PROPOSED REHABILITATION & DEVELOPMENT
ILOCOS NORTE
ILOCOS SUR
ABRA
LA UNION
MOUNTAIN PROV
CAGAYAN
ISABELA
NUEVA VIZCAYA
NUEVA ECIJA
PANGASINAN
ZAMBALES
TARLAC
PAMPANGA
BULACAN
BATAAN
MANILA
CAVITE
LAGUNA
BATANGAS
CAM NORTE
CAMARINES SUR
ALBAY
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MINDORO
MASBATE
SAMAR
LEYTE
CEBU
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NEGROS OCC
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ANTIQUE
ILOILO
PALAWAN
ZAMBOANGA
MISAMIS OCC
LANAO
MISAMIS OR
BUKIDNON
AGUSAN
SURIGAO
COTABATO
DAVAO
L U Z O N
PULP & PAPER MILL
IRON & STEEL PLANT
CAUSTIC SODA PLANT
IRON FOUNDRY
CATTLE RAISING
TIMBER
RICE
TOBACCO
COCONUT OIL PLANT
GOLD
ABACA
HYDRO-ELECTRIC PLANT
FURNITURE
FISHING
BASIC CHEMICAL PLANTS

policy for the eventual industrial expansion of the country may be formed.

In planning the number of industries which may be erected in each category, whether basic or supplementary, it is considered that plants of small or average capacity will be far more practical inasmuch as they may be built in strategic areas (so designated because of closeness to source and availability of transport) throughout the Philippines, thus contributing to the welfare of the particular locality in which they are established. This procedure will also tend to reduce the initial capital investment, thus effecting certain economies and affording closer supervision and training of the necessary skills.

Average capacity plants are recommended

The proposed program recommends using only the resources of the country which are now available in quantity, where the real need exists, in addition to manufacturing those products which could not readily be imported. Despite the fact that the Philippines is bursting at the seams with certain types of resources, it is apparent that there is still a pressing need for other types of products that are not so readily available in the country today.

The potential for industrial activity in the country is tremendous, since little more than cottage industries exist at the present moment. In view of this, the wisdom of a prescribed course, even though it may contain some aspects of Government direction, is self-evident.

Tremendous potential

Establishing and broadening the industrial economic phases of the Republic, construction of basic industries and the rehabilitation of established pre-war industries are absolutely essential and should first be considered. It is difficult to emphasize the importance of one as against another inasmuch as it must be realized that the entire program is integral to a great degree whereby each industry would materially supplement the other for the necessary services and goods produced for use throughout the domestic pattern. Considering the problem as of today, however, it appears that the following projects would rate in the order of their determined priority. These have been divided into two classes, pre-war and new, with some new industries based on reparations:

1. *Pre-war:*
    - a. Power
    - b. Rice and Corn
    - c. Fishing
    - d. Sugar

    - e. Lumber
    - f. Mining
    - g. Transportation
    - h. Communication
    - i. Animal Husbandry
    - j. Building materials
    - k. Coconuts
    - l. Abaca
    - m. Textiles
    - n. Handicrafts
2. *New Industries:*
    - a. Ammonium Sulphate
    - b. Soda Ash and Caustic Soda
    - c. Iron and Steel
    - d. Sulphuric Acid
    - e. Agricultural implements
    - f. Salt production
    - g. Pulp and paper
    - h. Shipyards

New Industries

The bulk of the new industries as noted throughout the report will be mainly private capital ventures other than in the fields where government will participate when private capital does not assume full risk, as suggested previously. The period of time necessary for the institution and completion of this initial program is estimated to be from 10 to 15 years. It is proposed that it can be undertaken not later than 1948, predicated upon anticipated cost and delivery dates of new equipment, plus the probable receipt of reparations equipment.

National Economic Council

Change toward Industrialization essentially sound

The Philippine Nation has made an intense struggle to attain industrial competence and independence. This report can only briefly sketch some of the more important possibilities to be expected as the country makes this transition. The move towards industrialization is essentially sound since the objective is the general amelioration of the world situation. It cannot be stressed too often that the envisioned goal is the manufacture of only those articles to which the resources of the nation are well suited, and in which it enjoys a comparative advantage. A necessary pre-requisite to economic planning and to a sound industrial existence is the authority to manipulate the tariff to suit the plans. The success of any plan to industrialize the country will depend chiefly on this authority to control the tariff. It is therefore submitted that a strong Tariff Commission, with broad powers, and competent long-range planning are two indispensables to the success of this or any other industrial scheme.

Indispensables to success

The task of framing the general economic plan should be entrusted to a National Economic Council. This group should be given the responsibility of organizing economic planning boards in all principal industries. These boards, in turn, should have the duty of mapping out a plan for their respective industries and should cooperate with and be responsible to the National Economic Council, thus solving the question of who shall plan and who shall execute the overall strategy.

The financial aspect of the plan should also come under the jurisdiction of the National Economic Council. In this field the Council should cooperate closely with the various Government banks. And the banks, in turn, should act as financial advisers to the Council and assist in the administration of the appropriated funds.

Technical staff is necessary

Furthermore, the Council will require a technical staff. This body should act for the National Development Company as well as serve the Government, thus insuring cooperation and coordination in addition to eliminating the possibility of duplication.

Inasmuch as the Council will have broad and extreme powers over all phases of Philippine industry, extensive study should be made and extreme care should be taken in choosing the proper personnel. Several other Government branches should either be headed by personnel from the Council, integrated within the group or supervised by the Council. These divisions are the Bureau of Licenses (Import, Export, Manufacturing), and the Tariff Commission.

Success or failure of new program

It is the suggested policy that the bureau or bureaus charged with the responsibility of granting licenses should, in the pursuit of their duties, determine to a large extent the success or failure of the industrial program. To license is to control, direct and supervise the industry so licensed. That is essential if the Council is to have the proper respect and confidence of private enterprises. It is a minimum requirement for a sound foundation upon which to build a substantial Philippine industrial economy.

Elsewhere in this report, various recommendations have been made for both broad and specific studies of numerous industries and for American offices for the National Development Company. Once these studies have been made, the Economic Council can become the repository, utilizing the information furnished, and can thus become fully informed as to the current status of all products and projects.

As its first official act, the Board should remove the National Development Company and all other Government business ventures from political control. This would give the Board power, prestige and a definite mission.

Broad statement of policy toward private industry

As its next step, the Board should make a broad statement of policy to private industry. It should first offer to help with plans, encourage and enter into joint partnerships; or secondly, agree to sell to private enterprise any Government-owned industry provided that the Council has been satisfied that such private enterprise is capable of assuming its full responsibilities.

National Development Company

The main Government agency in actual operation today is the National Development Company, founded in 1937 for the express purpose of "serving as an agency of the Republic of the Philippines in the furtherance of its economic policies." The Company, therefore, is the executor rather than the creator of economic policies which are formulated either by the Congress of the Philippines or by the Administration. The charter permits the Company to engage in any kind of business enterprise which is calculated to bring about a rapid but systematic development of resources. The management of the Corporation is invested in a Board of Directors consisting of the Secretary of Agriculture and Commerce and the Secretary of Finance as ex-officio directors and five other members appointed by the President with the consent of the Commission on Appointments of the Congress of the Philippines.

The authorized capital stock of the National Development Company is ₱50,000,000, of which ₱26,411,300 is fully paid.

Not organized to compete with private industry

The Company is not Government-subsidized or supported, nor has it been organized to compete with private capital This can readily be seen by the fact that it is taxed on exactly the same basis as private industry.

In order to carry out the purpose for which it was created, the N. D. C. has organized several subsidiaries to engage in varied commercial and industrial enterprises. An additional purpose of the Company is to develop industries in which private capital has not been invested. The following is a list of its subsidiaries which have now been reorganized in accordance with an executive order signed by

His Exeilency, the President, on October 4, 1947:

1. National Food Products Corporation
2. National Rice and Corn Corporation
3. National Warehousing Corporation
4. National Footwear Corporation
5. Cebu Portland Cement Company
6. Insular Sugar Refining Corporation
7. People's Homesite Corporation
   (This has recently been merged with the National Housing Commission)

Principal feature of latest Govt. reorganization

The principal feature of this latest Government reorganization is the creation of the National Enterprises Council which is headed by the President himself. The members of the Council are the managers of all the corporations owned and controlled by the Government, together with some additional members whom the President may appoint with the consent of the Commission on Appointments.

Within the National Enterprises Council will be a control committee composed of the Secretary of Commerce as chairman, the Budget Commissioner as vice-chairman and the Secretary of the Council as ex-officio member.

The control committee will supervise all Government corporations to insure economy and efficiency, and to pass upon the program of activities and budget of the corporations. It will also carry out the policies and measures formulated by the National Enterprises Council.

All the corporations of the Government will have at their heads either a president, general manager, or manager who are to be named by the board of directors. The president, general manager, or manager will direct and manage the affairs and business of the corporations subject to the control of the board.

The National Rice and Corn Corporation has been converted into an independent corporation. Previously, it was a branch of the National Development Company. On the other hand, the Agricultural Machinery and Equipment Corporation has been made a subsidiary of the N.D.C.

Other changes

The National Cooperative Administration has been replaced by the National Cooperatives and Small Business Corporation, which now assumes the functions previously undertaken by the Bureau of Commerce in encouraging, promoting and supervising the establishment of provincial trading corporations.

The Manila Railroad Company has absorbed the METRAN. The METRAN employees who may be considered excess of the actual personnel of the Manila Railroad will be included in a temporary budget and will remain in their respective positions as long as they are not transferred to other permanent positions in the Manila Railroad and its bus lines.

Merged into the People's Homesite and Housing Corporation were the National Housing Commission and the People's Homesite Corporation. The National Produce Exchange, the National Warehousing Corporation and the National Footwear Corporation were dissolved.

Expenses cut

The reorganization program will mean a cut of ₱6,009,994 from the 1948 governmental operating expenses.

In addition, the N.D.C. has also made considerable investments in industrial, transportation and other ventures with private capital. Among these are the De La Rama Steamship Company, the Philippine Air Lines and FEATI (the last has been merged with the Philippine Air Lines).

With regards to the rehabilitation and construction of old and new industries, the Company has been authorized to prepare plans for the following:

Plans being prepared for 11 industries

1. Livestock
2. Rice and Corn project
3. Rehabilitation of the Insular Sugar Refining Corporation
4. Sawmills and logging
5. Wood finishing, dry kilning, sash, door and plywood manufacturing
6. Expansion of existing textile mills
7. Rehabilitation of a pulp mill and the installation of two paper mills.
8. Reconstruction of the Binalbagan Sugar Central.
9. Nail Manufacturing plant
10. Veneer Mill
11. Malangas Coal Mines

A portion of the plans for the above mentioned projects have been completed and others will be completed before the end of this year. In addition to this, the Company owns fish ponds, canneries and other minor industries which are not operating due to damages sustained during the war.

Other government corporations and agencies, the operation of which directly affects Philippine economy although not connected with the National Development Company, are as follows:

1. **National Abaca and Other Fibers Corporation**
2. **National Coconut Corporation**
3. **National Tobacco Corporation**
4. **National Sugar Board**
5. **National Trading Corporation**
6. **National Power Corporation**
7. **Manila Railroad Company**
8. **Philippine National Bank**
9. **Rehabilitation and Finance Corporation**
10. **Land Resettlement Projects Administration**
11. **National Cooperative Administration**
12. **Manila Hotel**
13. **Agricultural Machinery and Equipment Corporation**
14. **Metropolitan Transportation**
15. **Manila Port Terminal**
16. **Metropolitan Water District**

Old business relationships broken

Philippine industries have always looked upon the United States market as their own. In many instances, business transactions have been done to really sell the American public on the many advantages of Filipino products. During the war, many old business relationships were broken and many pre-war industries discontinued business or secured new management. This severing of established relationships has seriously interferred with normal business operations and a healthy understanding and appreciation of the American market.

The Philippines, as an independent nation, still enjoys American relationships. If properly nurtured, these relationships will prove a real advantage in securing and holding the United States market. The development of American markets should be accomplished during the present period of advantageous taxes. It is believed that the proper approach to, and development of, the American markets would ultimately enable many Philippine industries to absorb 100 per cent American taxation and still prosper.

Real effort must be made

Serious doubt exists that full tax will ever be collected from all Philippine industries. In conjunction with this, there also exists the doubt that a full share of the United States market can ever be obtained without making a real effort to secure this prize.

P. I. offices in U.S.

Before the war, and again in 1945, the Trade Association, and National Tobacco Company approved the installation of an office or offices in America. This was done primarily to bridge the gap of 8,000 miles by personal representation and to make an honest effort to know, understand and help this very valued customer.

A brief investigation of Philippine business will show a hundred Philippine Island branches of American enterprises. These firms have established offices here primarily to sell American products in the Philippines. Because no real effort has been made to administer the export business efficiently, most of the import firms now also make a half-hearted effort to handle export items. These firms are primarily interested in the import business, have little, except selfish, interest in Philippine industry and commerce, and are further handicapped by the absence of uniform standards of quality, guarantee, insurance and procedure on items for which an export market may exist.

Estimated sales commissions

The estimated sales commissions to be paid by the National Development Company for the sale of its permitted quota of refined sugar in America will approximate ₱130,000. An additional ₱25,000 to ₱50,000 must be added to this for financing and storage. Commissions paid for the sale of the balance of the American quota by other island producers will approximate ₱850,000. This represents a sizable sum of money that could be used to organize, install, supervise and maintain joint offices for all Philippine industries in America. In this manner, the urgent need for island export representation and sales could be accomplished at a profit.

Sugar sales in U.S. for next 5 years

America has a need for more sugar than the Philippines can export for the next two or three years. However, while estimates of profit on American sugar sales may have to be scaled downward, it must also be noted that no figures have been computed for the sale of tobacco and other products. It is reasonable to estimate that the other industries would produce more revenue for the proposed sales office than would be lost through the shortage in sugar production. For at least the next five years, sugar sales in America will meet no sales resistance. This period may be used to build up good-will among all American buyers and to encourage the sale and trade acceptance of products that have never fully enjoyed the American market.

The National Development Company could very readily accept this added responsibility within its present structure and could assume joint responsibility with the National Tobacco Company and private industry. This procedure should not only promote additional business for all parties, but should develop harmony within various industries, gain international good-will and build added acceptance for Philippine products in the American market.

Before instituting this program, the Government should establish a rigid policy for the inspection of the quality and standards of all exports and should definitely adopt and enforce all American regulations regarding sanitation, purity, uniformity and identification. This will require the creation of an effective Bureau of Standards.

Standards of all export must be maintained

This should be a pre-requisite for Philippine exports and will go far towards helping to maintain the American market, and to provide quality goods to domestic consumers.

Trade Relations

The question of whether to permit free foreign trade or to check it by protective tariffs has been the crux of an economic controversy for the last century and a half. The American policy of reciprocal trade agreement has, in essence, been the lessening of protective duties not to exceed 50 per cent or former duties imposed prior to 1934, thus leading to greater international cooperation.

Crux of economic controversy

In the depression years of 1931 to 1935, the total annual Philippine trade averaged ₱370,000,000. After this period, trade expanded rapidly, reaching a peak of ₱520,583,990 in 1937. Of the total export-import trade, the major portion of business (71-93 per cent) was between the United States and the Philippines, with Philippine exports exceeding those of imports. The foreign exchange thus realized was principally employed to pay dividends and interests on foreign capital invested in the Philippines and for services rendered by foreigners, particularly in shipping and insurance. In 1940, due to the imminence of war, the position was reversed for two years, the total value of imports from the United States exceeding that of exports. With the liberation in 1945, the period from June to December showed heavy imports for rehabilitation purposes. For the first post-war normal year of international trade, the Philippines could export only 50 per cent of its former trade with the world. Imports during 1946 reached an all-time high of ₱606,506,000.

Imports reached all time high in 1946

The primary imports and exports for 1946 are listed as follows:

TEN PRINCIPAL EXPORTS — 1946

Principal exports 1946

1.	Copra	398,985,296K	₱ 78,020,891	61.0%
2.	Abaca	193,538B	9,652,576	8.0%
3.	Desiccated coconut	4,660,399K	4,100,480	3.0%
4.	Tobacco & Manufactures	—	2,503,311	2.0%
5.	Cordage	1,987,077K	2,222,443	2.0%
6.	Sheets & Manufactures	—	1,015,108	1.0%
7.	Rattan Furnitures	—	980,788	1.0%
8.	Hides and Skins	848,999K	761,602	1.0%
9.	Copra Meal and Cake	5,858,540K	657,742	1.0%
10.	Rubber, Crude	543,837K	528,507	0.7%
	Other Exports	—	27,931,601	20.0%

TEN PRINCIPAL IMPORTS — 1946

Principal imports 1946

1.	Cotton & Manufactures	₱ 94,476,363	16.0%
2.	Grains and Preparations	76,391,801	13.0%
3.	Tobacco and Manufactures	45,140,621	8.0%
4.	Rayon or other Synthetic Textiles	29,649,242	5.0%
5.	Paper and Manufactures	23,183,321	4.0%
6.	Automobiles, parts & tires	22,693,801	4.0%
7.	Dairy Products	21,424,183	3.0%
8.	Chemicals, Drugs, Dyes and Medicine	21,352,069	3.0%
9.	Iron and Steel and Manufactures	17,348,630	3.0%
10.	Fish and Fish Products	16,870,466	3.0%
	Other Imports	223,185,785	38.0%

As against the above figures, it is interesting to compare the primary imports and exports for the first half of this year:—

FIRST HALF YEAR, 1947
PRINCIPAL IMPORTS

Principal imports 1947

		Value
1.	Cotton and Manufactures	₱ 83,743,230
2.	Grains and Grain Preparations	75,052,710
3.	Rayon and Other Synthetic Textiles	46,591,710
4.	Dairy Products	30,886,400
5.	Automobiles, parts and tires	26,132,778

7.	Iron and Steel	20,424.424
8.	Paper and Manufactures	18,498,150
9.	Fish and Fish Products	18,326,746
10.	Chemicals, Drugs, Dyes and Medicines	16,276,264
	Other Imports	198,726,418
	Total	₱560,670,666

PRINCIPAL DOMESTIC EXPORTS:

Principal exports 1947

		Value
1.	Copra	₱181,133,094
2.	Abaca, manufactured	35,830,583
3.	Coconut Oil	4,126.680
4.	Coconut Oil	4,126,680
5.	Tobacco and Manufactures	2,218,556
6.	Maguey, unmanufactured	1,948,894
7.	Copra Meal or Cake	1,630,414
8.	Cordage	1,585,060
9.	Hides and Skins	762,549
10.	Rubber, crude	637,448
	Other Domestic Exports and Re-exports	15,228.457
	Total Exports	₱250,228,457

In accordance with the Philippine Trade Act of 1946, at the end of an eight year free trade period the United States tariffs will be applied at the annual rate of 5 per cent of the lowest duty assessed on the products of foreign countries until the full tariff becomes applicable in 20 years. American products will receive similar treatment in the Philippines. The only exception accorded local products is for cigars, scrap tobacco, coconut oil and pearl buttons, but the total of duty free goals would be limited to the absolute quotas fixed in the bill. This special arrangement with regard to the above products has been made to assure producers of these goods a longer period of adjustment than would be possible if increasing duties were to be immediately applied. The rates of ordinary customs duties as defined in the Act will have the effect of making the preferential duty on products from Cuba applicable to those from the Philippines, rather than the most-favored-nation rate which has customarily been included in other bills designed to govern trade relations with the Republic. After the period of adjustment, however, the most-favored-nation rate will be assessed on products imported from the Philippines. Inasmuch as the preferential rate from Cuba is at least 20 per cent less than the most-favored-nation rate, the Islands will have to make substantial adjustments after July, 1947. Under the terms of the Trade Act, it should be possible to re-establish United States-Philippine relations on the same basis as in pre-war years if America is successful in maintaining a high level of employment and national income. The volume of trade with the Philippines should increase except for those commodities imported into the United States which will be restricted by absolute quota. In the terms of the Act providing for eight years of free trade, 20 years would elapse before the U. S. duty on Philippine products would equal one half of the most-favored-nation rate. This would provide an ample period in which to establish a number of new export industries and to rehabilitate most of the pre-war export industries, even though it may be judged that the industries so re-established could not survive the most-favored-nation duty at the end of the twenty-year adjustment period.

Substantial adjustments necessary

Legislation designed to stabilize future trade relations with America presents a problem. The proponents of protective tariffs for the protection of industries which may be developed are, in effect, proposing greater domestic trade and internal production of needed goods as against the freer international exchange of products which may be less expensive and of better quality than those produced domestically. Reciprocal free trade does have advantages in the respect that essential goods produced in the nation would find preferential treatment in the United States. However, the problem of determining the goods to be received in exchange, whose receipt would not adversely affect local industries, will be a question of long study and determination by both parties as to the advantages to be gained therefrom.

Question of long study

Because of the urgent need of the Republic for certain basic foods and capital goods, and allowing for probable delays in the rehabilitation of export industries, it is expected that Philippine imports will substantially exceed exports for at least three years. There is no doubt, however, that this unfavorable balance of trade will decline as consumer needs are satisfied and local industries are established. The one apparent weakness in free trade as it exists today between the Philippines and the United States is indicated by the volume of luxury goods which have already been imported into the country. It is now clear that certain legislation should be forthcoming which is agreeable to both the United States and the Philippines regarding the immediate establishment of controls in the form of higher taxation on such imports of luxury goods in order to place the purchasing power of the population into productive use. It is true that no country is prone to make concessions which would injure its own producers. On the other hand, in the interest of the economies of both, it is obvious that some limitation will have to be placed on imports of luxury items until such time as domestic economy has sufficiently recovered and items formerly imported are being produced.

Legislation should be forthcoming

Japan, India and China do not, at the moment, have a satisfactory medium of exchange owing to unsettled internal conditions. The manufacturing potential of Japan is now under rigid control by the Americal Military Government, China is swallowed up in her civil war, and India is now being torn apart by religious dissention. The Philippines has no such crippling disadvantages. Instead, it has distinct advantages in its trade relations with the United States, and its position will be further improved when legislation is drafted and accepted by both the Republic and America which will essentially provide for reciprocity on capital goods basically required by each nation. If the Philippines applies her full effort to the tasks of rehabilitation and industrial development, and if the world remains at peace with an expanding international trade, the successful accomplishment of her aims will be assured.

Philippines has advantages over Japan, India, China

The extent of trade between this nation and countries other than the United States amounted to 25-28 per cent of the total export and import trade of the Philippines prior to 1941. Since July 1945, this percentage has been reduced to approximately 7-20 per cent of the total trade. As industrial development progresses over the next few years, imports from all countries will decline to a marked degree. With the possibility that international agreements will be required in order to govern trade relations with other nations, the external economic influences on the Republic of the Philippines can be readily judged by its insular position in relation to China, Australia, Japan and India. It can be forecast that with the development of new independent states in the Far East and the ever growing industrial economy of China, India and Australia, the Republic will be hard-pressed to maintain economic stability in its own domestic production if it must compete with the low labor scale of those countries. Unless an industrial system is established whereby comparable qual-

Republic will be hard-pressed

ity goods can be produced at low cost, tariff legislation will be necessary in order to protect local industries. With the industrial potential of Japan being limited as planned, the present situation of the Philippines dictates that an industrial economy evolve itself, based on the raw materials available. Together with the establishment of industries, the Philippines should strive for greater efficiency in the production of agricultural goods and export items for other countries. Efficiency will enable the export trade to compete favorably in world markets and provide low cost goods to the domestic consumer.

P. I. must have industrial plan

Geo-economically, the pressure from highly organized industrial nations against undeveloped states will increase. In this instance, the Philippines must develop a definite industrial plan and pattern in order to provide employment for its own people in new trades and industries.

War Damages

The Philippines was the only area under the American flag that suffered severe damage during World War II. The Japanese invasion and occupation, followed by American re-conquest, left in its wake battered cities, prostrate economy and wide-spread misery. Some idea of the enormous losses suffered from military action during the years 1941 to 1945 may be gathered from the following figures.

Forecast for 1950

In relation to the assessed valuation of all real properties amounting to ₱2,568,202,340 as of December 31, 1938, the Republic sustained damages of ₱1,573,570,125 to real properties based on 1938 values. However, the total destruction and losses sustained by the Republic amount to ₱3,433,319,049 (1938 value), which includes value for commandeered goods and services, Japanese currency issue, and budgetary expenditures allocable during the war against Japan. This latter figure does not include the disruption of domestic trade which has been estimated at ₱300,000,000 as compared against the total trade of the Philippines in 1938 amounting to ₱496,805,649, nor does this figure include the depletion of natural resources as a result of military occupation which is estimated at ₱4,488,258. As to the cost of rehabilitating the damages to structures, etc. in accordance with post-war prices, it is generally considered that a fair value for reconstruction and materials could be established on a normal cost index forecast for 1950. The forecasts and estimates conservatively determine that in order to reproduce all the losses sustained, excluding depletion of resources and losses of revenue, approximately ₱9,837,350,488 would be required. The war time casualties, including killed, missing and injured, amounted to an estimated 752,500 persons and the man-years expended on the war effort against Japan are estimated at approximately 6,210,000.

From the above figures, it can readily be seen that the Philippines is faced with a huge task in the reconstruction and rehabilitation of its economy. To this end, the United States has allocated through the Tydings War Damage Act, funds amounting to ₱1,240,000,000. These funds are to be used for the rehabilitation of government offices and public works and the payment of individual war damage claims. The difference between this figure and the total estimated 1950 value of damages sustained is a balance of ₱8,597,350,448, representing the losses incurred as a result of Japanese aggression.

Funds allocated by U. S.

It must be clearly understood that the proposed industrial rehabilitation and development program is not predicated or based on the receipt of Japanese reparations, the availability of capital, the method of financing or any other one factor, in whole or in part. It is based solely on the estimated needs and known potentialities of the Philippines and nothing more. Thus, the industrial capacity of the country has been established. On this basis the estimated capital requirements have been determined. The capital requirements may change almost constantly due to any number of factors, but the aforementioned capacity will remain constant. If the Japanese reparations are received, so much the better, in direct proportion to the quantity, type and condition of such equipment. The capital requirement will then be decreased and the industrialization program will be accelerated. If not, the industrial program as outlined can and will progress, but at a slower rate.

Program is based solely on known potentialities

The following industries have been designated as advanced reparations from the total Japanese reparations equipment pool:

Aircraft and aircraft engines
Arsenals (Army and Navy)
Laboratories
Machine Tools
Ball and Roller Bearings
Privately owned munitions plants
Iron and Steel
Thermal Power (steam)
Shipyards

Sulphuric Acid
Caustic Soda and Chlorine
Soda Ash
Aluminum and Alumina
Aluminum Fabricating
Magnesium
Synthetic Oil
Synthetic Rubber

The amount and type of Japanese reparations made available to the Philippines will naturally affect the industrialization program. In general, it may be said that the receipt of the required types of heavy industrial equipment will reduce the initial costs and will speed the establishment of certain industries.

The amount by which initial costs will be decreased will depend greatly upon the capacity, type and condition of such industrial equipment. It may be expected that some reparations equipment may not be efficiently or economically utilized. The costs of shipping and installing obsolete and depreciated machinery will probably not be justified except in exceptional cases and the purchase and installation of new equipment may be dictated. A careful study of each piece of allocated equipment must be made and, on the basis of engineering findings, a decision will be made as to the practicability of installing that equipment or purchasing new equipment.

Difficult to get new machinery

Inasmuch as heavy industrial machinery is in short supply and much demand the world over, much difficulty may be encountered in the purchase of new machinery. Delivery dates on equipment is, in some cases, five years removed. The early receipt of required equipment from Japan may greatly speed the establishment of certain industries. Naturally, various factors, too numerous to be mentioned here, will be carefully considered.

Amount or extent of reparations still unknown

The amount or extent of Japanese reparations equipment which will be made available to the Allied powers, and particularly to the Philippines, is at the present time unknown. Only recently a 40-member American Commission arrived in Japan to make a re-survey, report and recommendation of this Commission. A hazarded guess, not estimate, is that previously expected allocations will be considerably decreased.

It is fully realized that a portion of the above reparations will not be employed in the form in which they arrive but every bit can be converted and fitted into an industry where it can be used. It is admitted that many of these industries claimed as reparations are new to the Philippines and that some initial operating losses may be incurred. However, the inherent skill of Filipino laborers can readily overcome the early handicaps of performing new tasks in strange occupations.

Inherent skill of Filipino laborers

The allocated capacities of the above industries have been fitted into the overall program in accordance with the requirements of the Republic.

With regard to war damages sustained by the Filipino people as a result of Japanese aggression, these individuals have legitimate claims against that nation which must be resolved. A high level policy regarding the disposition of Japanese reparations must be established by the Government.

High level policy is necessary

The employment and use of equipment acquired as reparations is considered practical as indicated by the economic studies developed. Profits should accrue once minimum efficiency has been reached.

Labor

Before even a minimum efficiency can be attained, however, the human element must be considered. It is necessary to turn from machines to men, from industry to labor. The problem of labor relations in the Philippines has been in a state of flux for the past several months. This has largely been due to the fact that there has been no defined stand taken by the labor organizations on the one hand, or the Government on the other. There are over 200 trade unions presently operating throughout the Islands, some of them not as efficiently organized as others. No attempt at cohesion has so far been made and there have been a series of un-coordinated and mis-directed strikes in practically every branch of industry in the country. The picture as it stands today, however, is considerably brighter than it has been for a long time. Extensive efforts have been made to better the relationship between labor-management-government and labor leaders are at present contemplating a three-to-five year period of labor truce during which they will agree not to go out on strike.

No attempt at cohesion been made so far

A plan has recently been formulated for the unification of all the trade unions into a Philippine Federation of Labor, indicating that some responsible leaders recognize the necessity for a unified labor organization. There is no doubt that such an organization may become a stabilizing force providing it formulates policies which are founded on sound economic principles in the best interests of national unity. The mere indication that labor will abide by contract agreements and the maintenance of discipline within its ranks is a fundamental which it must assume for the realization of the industrialization program. On the other hand, it is equally apparent that the Government must also clearly define its labor policy in order to insure success in whatever rehabilitation plan it may embark upon. A broad, general social security and hospitalization program to incorporate all phases of the Republic's economic life may well guarantee stability within the labor movement, provided that labor itself will now realize the definite need for a defined policy as to the stand which it will take in this proposed industrialization program.

Definite need for defined policy

The following chart indicates the number of gainful workers ten years old and over by occupation groups and by sex for the year 1939:

Number of gainful workers in 1939

Occupation Group	NUMBER			% Distribution both sexes
	Male	Female	Both sexes	
Agriculture	2,981,551	474,819	3,456,370	40.8
Domestic & pers. serv.	123,508	3,354,576	3,478,084	*41.1
Prof. service	65,438	37,977	103,415	1.2
Pub. serv. (not elsewhere classified)	48,984	636	49,620	0.6
Fishing	175,841	4,728	180,569	2.1
Forestry & hunting	24,903	1,917	26,820	0.3
Mng. & quarrying.	46,625	394	47,019	0.6
Mfg. & Mech. Industries ..	333,876	267,359	601,335	7.1
Trans. & Com. ..	202,449	1,147	203,596	2.4
Clerical	44,904	3,995	48,899	0.6
Trade	171,099	99,667	270,766	3.2
Total.........	4,219,278	4,247,215	8,466,493	100.0

*Includes 3,145,763 housewives.

The distribution of labor supply in the country by age class for 1939, 1941 and 1946 is listed as follows:*

	1939	1941	1946
Total	7,304,300	7,720,200	8,672,900
Actual labor supply	6,095,497	6,442,600	7,237,000
10 — 14	732,749	774,500	870,000
(X) 15 — 54	4,766,188	5,037,500	5,658,700
55 and over	596,560	630,600	708,300
Students	1,208,803	1,277,600	1,435,900
10 — 14	913,731	965,700	1,085,200
15 — 34	294,750	311,500	349,900
35 or over	302	400	800

The estimated labor supply in the Philippines, by regions, is indicated in the following chart:

Estimated labor supply in Philippines

Estimated Labor Supply in the Philippines, by Regions

	1939	1941	1946
Luzon	3,738,200	3,941,600	4,336,100
Visayas	2,616,200	2,745,100	3,207,600
Mindanao - Sulu . .	949,900	1,033,500	1,129,200
Total	7,303,300	7,720,200	8,672,900

The birth rate in the Philippines has not registered any unusual change during the past five years. However, during a normal peace-time period, the population may be expected to increase at the rate of 2.8 per cent per year.

There are no general statistics at hand as to the number of unemployed persons now available as a potential labor supply. Pre-war statistics indicate that 8,456,493 persons were gainfully engaged in all classes of work. Of this total, 601335 or 7 per cent were engaged in manufacturing and mechanical industries. It is assumed that due to economic dislocation and the severe reduction in production from pre-war figures, 50 per cent of the 600,000 total have now been added to the unemployed roster. In a limited industrial economy such as the Philippines must necessarily have, it is estimated that 15 per cent of the total gainfully employed population would be absorbed by the industrialization program and would establish a potential skilled industrial labor force of 1,500,000 persons.

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* The term "labor supply," for the purpose of these estimates should be understood to include 10 years of age and over who are able to work.

(X) This classification is intended to show the most effective portion of the labor supply, that is, the age group 15 to 54 years.

The following figures indicate the estimated future employment group for a ten year period:

Estimated future employment

Manufacturing	1,500,000
Sugar	1,200,000
Other agricultural pursuits	2,800,000
Domestic and Personal	2,700,000
Professional Services	300,000
Public Service	150,000
Fishing	175,000
Forestry and Hunting	60,000
Transportation and Communications	275,000
Clerical	180,000
Trade	350,000
Mining and Quarrying	85,000
Total	9,775,000

With the gradual establishment of industries, wage stabilization and employment will develop. Indications are that the construction, professional and agricultural categories will show the first marked increase in employment, closely followed by the gradual rise of manufacturing and other service groups.

Mindanao will be focal point

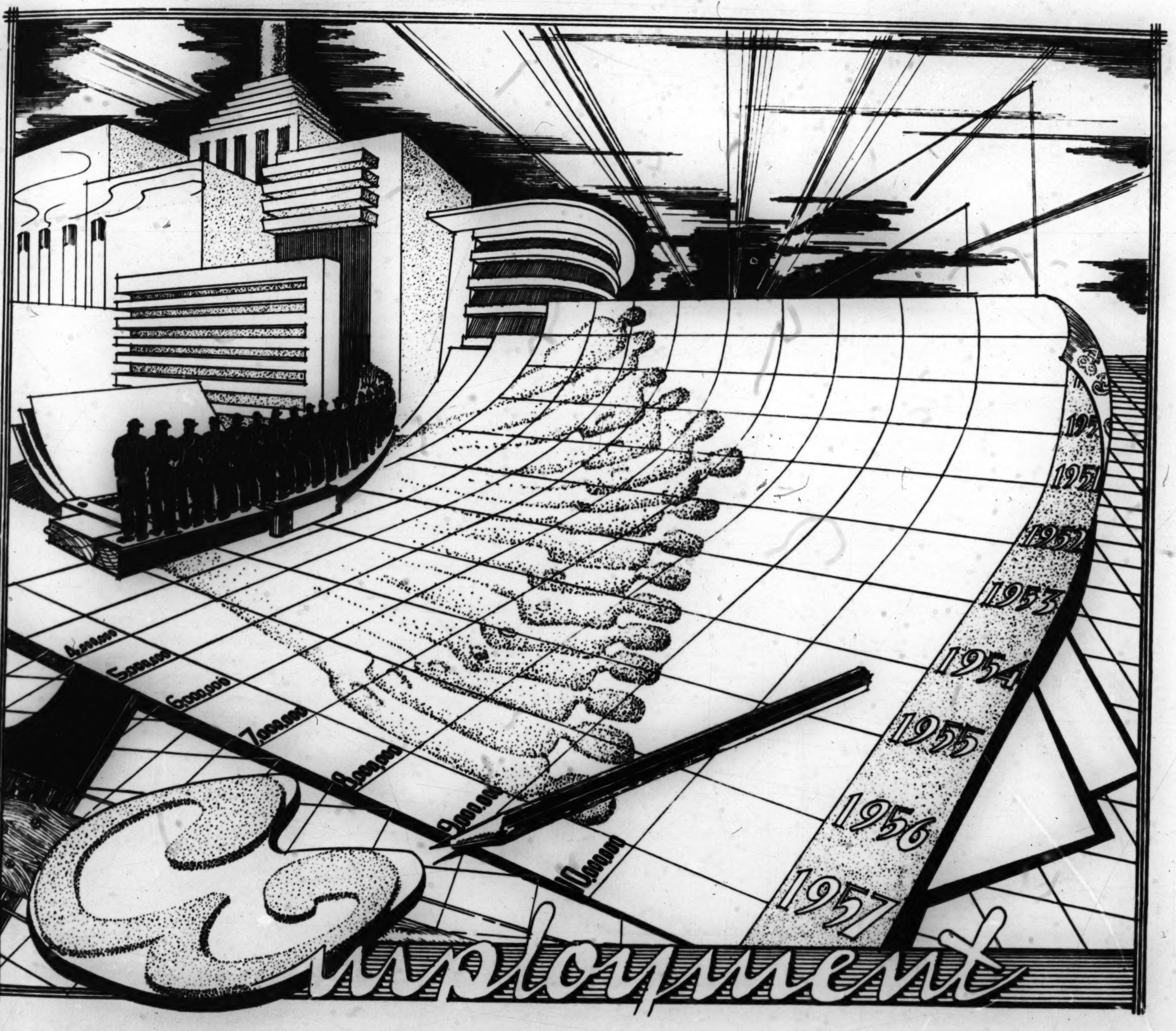
Population shifts from densely inhabited areas as a result of the growth of new centers of industry will continue to be a problem. It is considered that Mindanao will be the focal point for the influx of industrial workers.

Vocational Training

Linked with labor in the attainment of the industrial goal is the vitally important question of vocational training. In the preliminary work of outlining the foundations of future industries this subject has been given very special consideration. It is one of paramount importance for the availability of skilled technicians and the adequate direction of skilled labor by competent management largely determines the success or failure of any industrial or technical enterprise.

Primary shortcomings

The primary shortcoming in the Philippine labor situation today is the serious shortage of skilled technicians, mainly because the country, being largely a non-industrial nation, has had no need for technicians in the past. Although a considerable number of Philippine citizens studied technical subjects abroad, the percentage was


4,000,000
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6,000,000
7,000,000
8,000,000
9,000,000
10,000,000
195
1951
1952
1953
1954
1955
1956
1957
Employment

really very small and those who did return to their mother country found little or no opportunity for the practical application of the knowledge they had gained. This was unfortunate, for practical application is perhaps the most important single factor to be considered. The acquisition of a degree or a certificate forms only a sound foundation for application and means little or nothing unless it can be utilized in a practical field. It is obvious that the most satisfactory manner in which this problem may be solved is by the institution of adequate "vocational" or "trade" schools to produce the required technicians.

Trade schools are essential

It is hereby necessary to differentiate between general and vocational education by stating that unlike general education, a highly developed vocational program is not self-perpetrating. It has a definite goal to attain, and when that goal is accomplished, its mission is completed. Vocational education, particularly in the industrial fields, is subject to constant change and must incorporate the latest developments in order that its success may be insured.

In the United States the educational trend has become more and more vocational for several reasons, some of which are:

1. "White collar" professions have become overcrowded and in general do not pay as well as the skilled and semi-skilled grades, particularly since the advent of strongly organized labor unions.
2. As contrasted to vocational education, general education requires a relatively long, arduous apprenticeship period and the recipients are usually not qualified on graduation from school.

Here in the Philippines, these facts are much in evidence. Graduate accountants, bookkeeepers, and other white collar classifications frequently receive less salary than truck drivers, stevedores, and other manual laborers.

To sum up, it can be stated that a considerable number of technicians will be required for the industrial program that has been envisaged in these pages. These technicians are not now available. There is one way, and one way only, by which they can be most efficiently produced and that is by the institution of an efficient vocational or trade school program.

Only one way

Based on the total overall needs of the industrialization plan, a very considerable vocational program would be required. It must be kept in mind, however, that the proposed industrialization will not be accomplished overnight. A period of up to 15 years has been envisioned. This means that the technical training program will be extended over the same period and that while it will be of considerable magnitude, it will not be of prohibitive size.

General steps required

Without going fully into the details of the program, it is sufficient at this point to state that the following general steps will be required:

1. A general study, theoretical and practical, of unit operations that will involve all the necessary fundamentals required in any type of manufacturing process.
2. Theoretical study, according to a pre-arranged program, largely confined to fundamental theories and calculations required by any particular work.
3. Practical application of the theories which have been studied. This practical application will generally require a period of not less than six months and will be conducted "on the job" in factories in actual operation, either in the Philippines, in the United States or in other foreign countries.
4. The inclusion of vocational and technical courses in the public and private schools has been a recent innovation in the Philippines. However, the success of these courses has been questionable. Unfavorable factors appear to be the limited scopes of the technical courses and field, fluctuation of technical requirements and the lack of plants and industries wherein the theoretical knowledge gained may be assured practical application.

   Interesting sidelight

   An interesting sidelight is the newly instituted program of the United States Department of Commerce whereby prospective foremen, machinists and other technicians from certain South and Central American countries, Mexico and the Philippines are offered extensive theoretical, technical and practical training in the largest and most modern industrial plants, covering nearly all fields, in the United States. The return of these students to their own countries will bring incalculable benefits.
5. The Filipino people are recognized to be alert and progressive, and to possess inherent intelligence. A well planned and well rounded educational program, properly executed, will without doubt meet with success.
6. In view of the statement made that the building trades cate-

gory will show the first marked increase, a training program will be required.

Skill, knowledge and human energy will be necessary in order to achieve any worthwhile results. Industrialization will also encourage and establish higher standards of living and wages, which could only be made possible by increased production. This will mean increased mechanization which, in turn, will require highly trained men to operate the necessary industrial and agricultural equipment.

Will establish higher standards of living

The following is a list of general unit operations that will involve all the necessary fundamentals and training to be required in any type of manufacturing process:

a. Heat Flow
b. Fluid Flow
c. Methods of Comminution
d. Mechanical Separations
e. Distillation
f. Drying
g. Gas Conditioning
h. Evaporation
i. Absorption and Extraction
j. Mixing
k. Movements and Storage Materials

Model Communities

In conjunction with the proposed industrial program, it is strongly urged that provisions be made for the further studies of model communities wherever a new industrial development is contemplated. This work can be initiated by the existing Urban Planning Commission and such forethought may well presage labor stability and incentive. It is envisioned that in the formation of a new industrial phase as a part of the national economy, two spheres of influence will develop, one centering in Manila and the other in Mindanao. With the selection of the province of Lanao, Mindanao, to be the site for many of the proposed industries and with the eventual agricultural expansion and development of Mindanao as a result, close attention was paid to power, water supply, harbor facilities, weather, and sources of raw materials.

Further studies of model communities recommended

In a radio broadcast, Mr. Louis J. Croft, head of the Urban Planning Commission, brought out the following points for consideration in the creation of new model communities in the Philippines:

Unlike the garden cities of Letchworth and Welwyn on the outskirts of London or the four green-belt towns of the United States, the new town in the Philippines can be built to provide sufficient work for its inhabitants. With the exception of these towns, and also Washington D.C., Canberra and New Delhi, the sites of very few cities in the world have been selected and planned in advance of their development.

Profit from lessons learned by other nations

The Republic, on the other hand, standing now on the threshold of its industrialization, can take full advantage of what other nations have had to learn through trial and error over a long period of years. New towns could be developed which would not only be efficient in themselves, but which will also provide decent living and working conditions for the people living in them.

The new towns should be located with particular reference to raw materials, communication facilities—both land and water — and sources of hydro-electric power.

Requirements for new locations

Wherever there is an opportunity, these new towns should have a healthful climate; proper drainage; good geological structure and soil conditions; suitable topography for the development of inexpensive utilities and streets; adequate water supply—including drinking, sanitation and industrial water; and finally, easy accessibility to markets and steamship lines. If a choice is possible a location having scenic resources should be given preference.

Terrain that is reasonably level but which is neither flooded nor swampy should be available for large industrial plants. In addition, an adjacent area for residential neighborhoods, playgrounds, and local shopping centers should be provided. Large recreational areas on the outskirts of the town are especially desirable and in addition to this, the selected site should also be free from malaria and other tropical diseases.

Emphasis on industrial towns

Since the emphasis in this report centers chiefly on industrial towns, the first problem to be solved is that of the extent and the nature of industrial sites which have adequate access by water or land, or both. These sites should be sufficiently large with reasonable possibilities for expansion. Conveniently near-by residential neighborhoods in units of 600 to 1000 families should be located. The heart of the residential neighborhood should contain an elementary school and a playground. The possibilities of expanding the industrial zone, together with the possible growth of additional neighborhoods, should always be borne in mind by the planners. The separation of industry from the residential areas, and of the residential neighborhoods from themselves by a green belt has proven very satisfactory.

A central business district, which is conveniently located, should be incorporated in the plan and if the town has a possibility of further development, an additional neighborhood with conveniently located shopping centers should be provided. One or two outlying larger recreational areas should also be included; particularly a beach, a river bank or mountainous terrain where outdoor recreation will be available.

If railroad facilities are available, they should be located near the town, but not in the heart of it. There should also be an airfield, if such becomes necessary. The industrial areas should be located so that their noise, danger, dust and smoke interfere as little as possible with the living and working conditions of the work people.

Sad history of many towns

The land devoted to industry, commerce and other enterprises, such as hotels, apartments and boarding houses, should be held in small government ownership and be leased to entrepreneurs, with the lease depending on the capital investment required. The sad history of many towns has been that of speculation to the gain of the disinterested and often ruthless speculator and to the distress of home-owners, and the community at large. The provision of public housing for laborers should be thoroughly studied and each case should be decided on its own merits. The romance, thrill and soundness of home-ownership should be encouraged, but nevertheless, in many instances, it has proven to the advantage of the laborer to rent his house and not to own it. Government housing ownership as against private ownership is recommended in such instances.

Another step in nationhood

The Philippines will thus take another step in its nationhood. With industrialization, the living standards of its people will improve. New and efficient modern towns in harmony with the machine age can become a reality. The living, working and playing conditions of the people can be given their proper emphasis. With the cooperation of the Government, the industrialists, the planners and the people themselves, the Philippines can have model towns worthy of a new nation.

Licensing of Industries

Controversial problem

Turning now to the subject of manufacturing licenses, this will undoubtedly require careful study and determination as to the extent and circumstance of such control. The problem and its solution will be controversial in scope when viewing the system of free enterprise attendant with democratic institutions. Nevertheless, limited economy must develop protective devices to achieve stability within its industrial framework. A mild imposition of restrictive measures does not place undue hardsip on industries, but rather inclines towards preventing unnecessary composition and speculation.

Fundamental rights of individuals

Legislation designed to promote a planned economy should take into consideration the fundamental rights of individuals to invest, thus contributing to the national welfare and income. However, the policy must afford that investor with qualified direction through planning and through the control and judgment of an economic council as to the likely fields of endeavor for a sound economy. As referred to in the section dealing with the National Economic Council, to license is to control, direct and supervise the implementation of any basic industrial plan formulated. Therefore, the extent of power granted to the National Economic Council must incorporate the broad outline of the following conditions:

*1. The capitalization of industries, the establishment and development of new industries, and the development of existing industries.

2. The rendering of assistance, by means of subsidies, grants, loans, tariff concessions or preferences, embargoes, or otherwise, with a view to the establishment and development of new industries or the development of existing industries.

3. The stimulation and expansion of production and sales.

4. The application of efficient methods and coordination to production and distribution including the full utilization of established advances in technique, practices, procedure and methods.

5. The encouragement of scientific research and, if it is deemed practicable and desirable, the institution of an organization to undertake research within the industry.

6. The establishment and maintenance of a basis for equitable competition within the industry.

7. The formulation of standard specifications and standard codes of defined practices, processes, methods of procedure, standard trade descriptions and definitions and simplified practices in so far as practicable and reasonable.

8. The methods and forms which persons marketing products conforming to provisions contained in the last preceding paragraph of this regulation, shall employ to certify that the goods they offer for sale conform to the requirements of any standard or other pro-

vision, which may be formulated pursuant to the preceding clause.

9. A survey of the industry and the assembly of information relating to any consideration which may affect the industry.

10. The development or use of facilities and schemes for the training of workers for employment in the industry.

11. The formulation of methods for improving the environment and amenities of premises; for promoting and adopting schemes of social welfare and general betterment and advantage to persons engaged in the industry; and for giving encouragement and assistance to licensees in adopting such schemes or methods so as to increase efficiency, promote better relationships between employers and employees, and advance the welfare of persons engaged in the industry.

12. Methods of marketing, delivering, packing and display.

13. The adoption of any other reasonable means of securing conservation of resources; the most economic utilization of raw materials, plants, labor, and capital; and the elimination of waste resulting from the production, distribution, or sale of goods in redundant type, dimensions, or grades or waste otherwise arising.*

Basis for planned industrial economy

The above conditions essentially are those which will form the basis for a planned industrial economy. The council should be further given powers in the granting of licenses and setting conditions forming the license granted to industry. It is recommended that with the formation of the proposed National Economic Council the above subject matter be given careful consideration. It is considered to be of utmost necessity that adequate measures be adopted to control any over-production or excessive competition in the future industrial pattern of the Philippines.

(The Licensed Industries General Regulations 1940, New Zealand—Serial No. 1940/279 and 1936 No. 40)*

National Currency

Most stable currency in entire Far East

Turning now to the current position of the peso, it is a notable fact that the Philippines possesses the most stable currency in the entire Far East. The monetary system of the Republic may be described as a dollar exchange standard. The par value of the peso is "pegged" by law at ₱2 to US$1. Except for subsidiary coins, the currency of the country consists wholly of Treasury Certificates which are backed 100 per cent, in part by silver coins in the Philippine Treasury, but primarily by United States dollars held on deposit either in the United States Treasury or in American banks.

As of January 6, 1947, the Republic had on deposit in America ₱656,758,845.78. Of that amount, ₱648,399,910.21 constitutes reserve for currency now in circulation in the Philippines. The "pegging" of the peso to the U. S. dollar has essentially stabilized Philippine currency with the effect that among world currencies, the peso is recognized as a stable monetary unit. This situation can be contrasted with the uncontrolled currency inflation now rampant in China, where dollar credits and exchange are not sufficient to stabilize the internal financial requirements of that country.

"Pegging" the peso

It has been recommended by the joint Philippine-American Finance Commission that the government adopt a managed monetary system in which monetary authority and responsibility rest in a central bank. The joint Finance Commission report points out that such a system would entail the abandonment of the automatic 100 per cent reserve system and permit the central bank to regulate the money supply to meet the internal needs of the national economy. It could moderate the inflationary effects of temporary surpluses in the balance of payments by permitting reserves to rise in relation to the money supply, if necessary, or reduce the deflationary effects of a temporary deficit by allowing reserves to fall. Philippine authorities could thus distinguish between their peso and their dollar needs.

Managed monetary system advised

A central bank would also provide an instrument through which comprehensive and authoritative data on inward and outward flows of funds could be compiled and capital flights controlled if the need should arise.

Advantages of central bank

The formation of this central bank is now in the preliminary stage. Its advantages would be numerous:

1. It could assist materially in establishing a domestic market for Government securities.
2. It could increase the effectiveness of the banking system by offering the re-discount facilities to the banks.
3. It could diminish the vulnerability of the banking system in time of emergency by acting as lender of last resort.
4. It could enable the banks to contribute more fully to the rehabilitation of agriculture, industry, and trade.
5. It could encourage the extension of credit along socially and economically desirable lines.

Foreign Capital

With regard to foreign capital, the acceptance, by referendum, of the Parity Act as represented in the Philippine Trade Act of 1946 which grants equal rights to American citizens in the development and exploitation of the natural resources of the country, is primarily aimed at attracting venture-capital for the development of these resources. However, the desire of the Government to participate in many of these new industries must be based on a policy that the most preferable is that which will invite foreign or American private capital and Philippine private and public interests to participate jointly in any new venture which may be planned.

Equal rights to U.S. citizens

The recent news articles expressing the opinion of the influential Journal of Commerce of New York City stated that American business is waiting for clarification of certain important issues which are as follows:

1. The recommendations to the Philippine Government by the Philippine-American Finance Commission. (This report has been completed).
2. The easing of the material supply situation in the United States so that construction materials can be imported and building thus accelerated.
3. Conclusion of a treaty to avoid overlapping taxation.
4. Determination of the amount of war damages to be paid to private enterprise.
5. The clarifying and strengthening of the trade position.

There are other factors which American investors must take into consideration. These can mainly be attributed to unsettled world conditions and internal domestic problems which now exist in the United States in so far as labor and government policy is concerned. The reconversion from the war economy in the United States has been deterred by these same factors.

Due to the tremendous backlog of orders for production equipment which have accumulated during the war years, United States manufacturers are quoting from 12 months to three years delivery. The United States, representing the only producing country of heavy industrial equipment, is faced not only with the gigantic task of meeting domestic and world material demands but also the maintenance of economies in other countries by financial risks as well. Private investors in the United States have evidenced their interest in the industrial possibilities of the Republic. However, for reasons stated above, it appears that it will be some time before American

U. S. investors interested in P.I. possibilities capital will take advantage of the equal rights granted it by the Philippine Trade Act. If joint capital ventures, both Philippine and American, can be instituted with incentives provided by the government for the establishment of any new industries under such management, it appears that a bright future is in store for the country. The experiment of Mexico along similar lines, wherein government and private capital have joined for the industrial development of the country, appears to have been successful. Nevertheless, there are limiting factors in the development of Philippine economy, namely:

Similar experiment in Mexico was successful

1. Unless an adequate and workable system of licensing industries is instituted whereby production is controlled, there will be unchecked overproduction of staple goods in certain categories, and the unnecessary depletion of irreplaceable natural resources, or both.
2. Unless the Government announces a general policy with certain minimum inducements, it will be extremely difficult to interest the necessary capital for such ventures.

Limiting factors in development of P.I. economy

Some policies have been announced, such as a tax free period of four years. Republic Act No. 35, for instance, exempts from the payment of all internal revenue taxes those concerns engaged in new and necessary industries which have a vital contribution to make in the current reconstruction effort. However, the points raised in the introduction to this section should all be incorporated into a general proclamation clearly stating the position of the Government in so far as industrial development is concerned.

Vital contribution in current effort

In 1946 a series of tax bills passed at a special session of the Philippine Congress provided, with only one exception, for generally increased rates of existing taxes or modified administrative provisions of the Internal Revenue Code. The more significant changes in the rates were as follows:

Excise Taxes — specific taxes on articles subject to excise, with the exception of fuels, were generally increased by 20 per cent or more.

License business and occupation taxes — were increased by varying percentages. Taxes on specified luxury articles jumped from 10 per cent to 20 per cent, semi-luxury items were boosted from 5 per cent to 10 per cent, and other taxes raised from 3-1/2 per cent to 5 per cent.

Documentary Stamp tax — rates in general were increased by 50 per cent.

Income tax — increased by about 300 per cent on individual incomes in the net income brackets up to ₱100,000. The higher brackets were raised by progressively lower percentages.

For complete details on taxation in the Philippines, a perusal of the Report and Recommendations of the Joint Philippine-American Finance Commission is recommended.

No basic policy to deter U. S. capital

Actually, there has been no known basic policy established which should deter American capital from entering into new ventures throughout the Republic. The fact remains that with policies of foreign investment yet to be defined and with the existing vast business potential within the United States, many manufacturers believe that domestic business can well take care of their operations for years to come or until the world demand is completely satisfied. If Japanese industrial economy is restricted to a level designed to maintain a small portion of foreign trade, the Philippines can essentially establish an industrial system with the aim of exporting into markets formerly enjoyed by the Japanese. Once domestic demands are met and the productive efficiency of the proposed industrialization program has been demonstrated, the accomplishment of this aim could very possibly be realized within eight years. Venture-capital must, however, realize that by the time that competition from revived industries in Japan, China, Australia and other countries makes itself felt, the highest peak of Philippine industrial efficiency must have been reached in order that its markets may be maintained. Quick and apparent profits will not be forthcoming from many of these industries, (actually some will lose initially and will require capital reserves) but it must be recognized that a long term investment and amortization period are necessary in order to establish industry on a sound basis wherein low cost of production is maintained and articles of quality are produced. In many instances, the narrow margin of profit between production costs and sales will require great efficiency in unit production.

Highest peak of production must be reached

Required Investment

Estimated extent of required investment

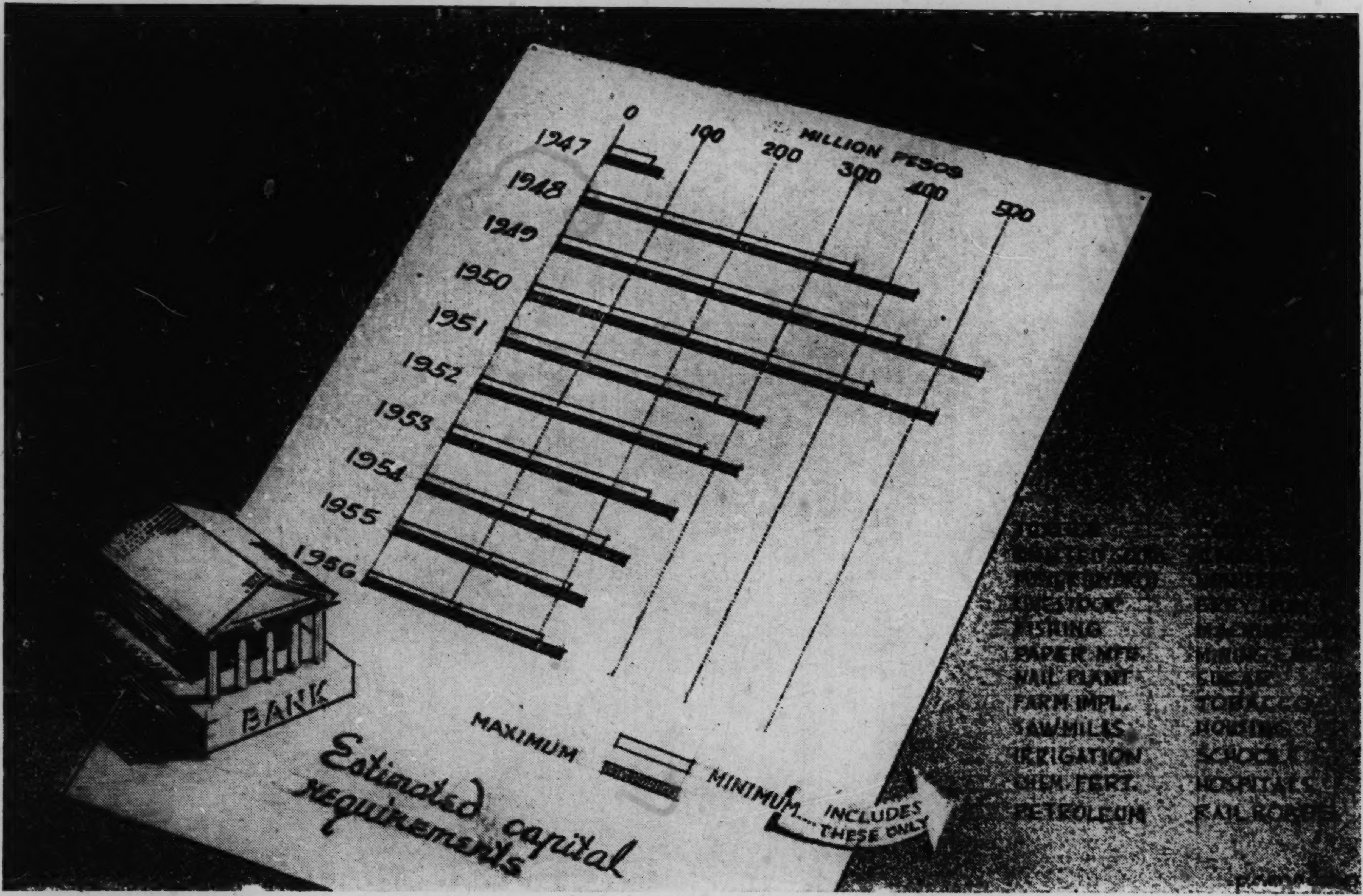
The extent of investment required by public and private industries for the overall industrial program, exclusive of hospitals, schools and housing, shipping and transmission lines, etc., would amount to an estimated ₱1,567,353,489. This sum includes the rehabilitation of pre-war industries among which are included sugar, mining, communications, highways, port facilities, sanitation, water systems and other small pre-war industries. Also included in this sum are the capital requirements of new industries which may be developed over the period of 10 to 15 years. These are iron and steel, chemicals, new textile mills and other basic and supplementary projects. In some instances the basic industries may be developed from reparations equipment, the balance of the equipment to be purchased new and financed either by government or private enterprise. The total annual expenditure required for the next 15 years is estimated at ₱104,490,233 exclusive of housing, etc., as mentioned previously. The capital requirement for housing, hospitals and schools for the next ten years is estimated at ₱1,600,390. The sum of all projects and development facilities would amount to approximately ₱3,167,743,489.

Total expenditure required for next 15 years

It is generally estimated that the total capital cost of approximately ₱3,000,000,000 would increase the assessed valuation of real estate and industrial establishments as of 1938 by 120 per cent, exclusive of the value of natural resources and other intangible items. Inasmuch as it is difficult to determine at what level the postwar prices of equipment and materials will stabilize, these estimates are believed to be conservative. The values placed against such industrial category indicate an average cost index for the next five years.

Estimates believed to be conservative

A short range program of five years, embracing the major portion of Japanese reparations equipment and other new industries which may be purchased, will involve an expenditure of approximately ₱500,000,000. According to competent financial authorities, this latter figure may well be considered an investment which can be undertaken by the Republic for the development of its economy. It is believed that the growth of a major portion of the supplementary industries will be a matter of the establishment of the basic units required and that the growth will take place shortly after the expiration of the estimated five-year period. Many of these supplementary industries will be undertaken by private capital inasmuch as this group must assume the risks necessary to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SAWMILLS
IRRIGATION
CHEM. FERT.
PETROLEUM
TOBACCO
HOUSING
SCHOOLS
HOSPITALS
BANK
Estimated capital requirements

round out production development in conjunction with basic government investments in industry.

Recommendation is heartily endorsed

The recent recommendation of the Philippine-American Finance Commissions that the United States entertain any request for industrial loans by the Republic is heartily endorsed. Through the National Economic Council, a short range plan based on the overall program could be developed to arrive at an estimate of expenditures required for the establishment of basic industries the equipment for which will not be obtained as reparations. A prospectus can then be prepared with the express intent of negotiating for an industrial loan to initiate the phase of the program that is not covered by reparations.

Graph on opposite page

The Government has announced through the Rehabilitation Finance Corporation that this group will assist and undertake capital loans to industries and individuals for industrial and domestic purposes. The accompanying graph on the opposite page shows details of money to be spent per year by private capital, capital-government, and solely Government.

National Income

The principal changes in the Philippine national income which can be anticipated at the present time are those due to the recovery of the major export industries, those depending upon United States payments and those to be derived from the successful institution of the proposed industrial program. Of these three, however, only payments from the United States can be considered as not being extremely variable. It is difficult, therefore, to project the total national income with any degree of accuracy.

Venture problematical

Two factors make any estimate of national income based on monetary values an extremely problematical venture. In the first place, prices have risen steadily since 1938. And secondly, barring untoward world events, there is the possibility that they will decrease and stabilize at some point within the next five years. In view of this, the estimate on national income should most probably be based on physical volume of goods and services produced. Here again, there is another difficulty. The problem of reconciling the physical volume of goods and services produced and United States payments in monetary values, both based on the fluctuating prices of real commodities, is another speculative estimate.

Taking these points into consideration it is felt that a projection of national income for the next five years in monetary values would constitute as indicated a hazardous guess rather than a well-founded estimate. Therefore, national income may be expected to rise for the next two years due to increased rehabilitation of pre-war exports, increased production of goods and services and receipt of United States payments. Thereafter, exports, goods and services may expect slighter increases and United States payments marked decreases, producing a net decrease in national income. At this time, however, the proposed industrialization may be expected to increase national income to a point where, at the end of the five-year period, the pre-war income, based on physical volume of goods and services, may be achieved. From this point on, a rise in national income in proportion to the rate of development of the industrial program may be expected.

Net decrease in national income

The report of the Joint Philippine-American Finance Commission indicates that estimated changes in exports and United States expenditures as compared with 1946 are as follows (millions of pesos):

Estimated changes in exports

	1946		1947		1948		1949		1950
Exports	(actual) 128	+	177	+	304	+	399	+	460
U.S. Govt. payments	672	+	166	+	166	-	2	-	232
	800	+	293	+	302	+	230	+	228

This estimate does not include, however, the increase in national income that may be expected as a result of the development of new industries as planned.

Private capital ventures for the rehabilitation of pre-war industries and the establishment of new industries have been mainly confined to the following principal types: sugar, mining, hemp, fishing, lumber, refrigeration, construction, shoe manufacturing, power generation, shipping, furniture, plywood, rubber goods, steel fabrication, shipyards, machine shops and other miscellaneous small industries. However, due to the lack of a centralized statistical system and the private nature of the ventures, the productive capacities and the investment costs are generally unknown. It may be said that private industrial investments have been retarded by the lack of ready capital, the shortage of equipment and materials and the delay in payment of war damage claims. Many plans for private enterprise no doubt remain in the formative stage.

Many plans in formative stage

Free Port

Idea has been considered

The establishment of a free port or ports in the Philippines has been considered by various Government and commercial groups. Although a recommendation as to the advantages of such a project is not considered within the scope or province of this report, a brief discussion of the subject is felt to be of sufficient interest to justify inclusion.

In speaking of a free port, only a free port area is envisioned, since this will accomplish all the advantages of a free port without affecting Government revenue. A large area could offer exceptional manufacturing possibilities together with space for houses, shops, and other services. Thus it becomes a city within a city and in any case must be completely separated from all adjacent territory, making the normal port functions separate and secure and giving additional advantage to the Free Port Area.

Two advantageous locations are available

Two advantageous locations are available today in the Philippines. One is a marshy area between Manila's North Harbor and the Malabon River. The other is located at Guiuan, Samar. The latter is perfectly equipped for immediate use since the United States Navy made this port one of the finest locations in the entire Orient.

The North Harbor site has an almost perfect geographic location but would prove an expensive project because of the necessity of land reclamation and the erection of buildings and warehouses. Both locations, however, possess exceptional advantages that should be given serious consideration at the present time.

Advantages

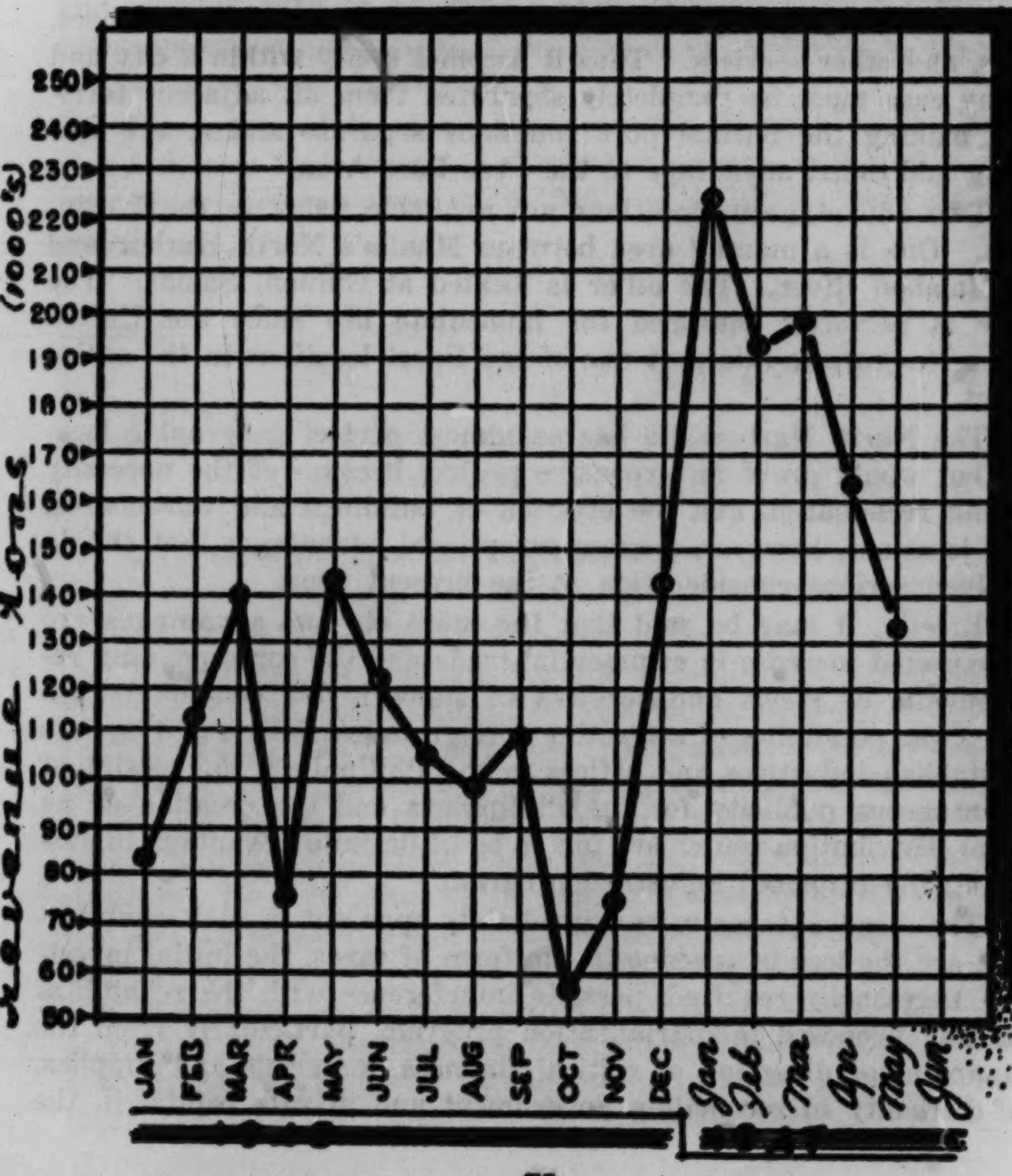
Briefly, it may be said that the more obvious advantages are the expected increase in commercial trade and the corresponding requirements of goods and services to support this commercial increase, the possibility of attracting foreign industrialists and traders to establish industries and offices in the Philippines, the receipt of advantageous publicity for the Philippines and the creation of an Orient distribution center are felt to be of definite advantage in sustaining the proposed industrial program.

Disadvantages

The disadvantages more immediately apparent in such establishment are the loss in revenue in the form of taxes, the initial investment necessarily required, possible interference with the rehabilitation and proposed industrialization program, particularly from the standpoint of diversion of critical finances, materials and supplies, the difficulty in reconciling government and private capital in the pursuance of this enterprise, and the economic and commercial dislocation which might be incurred at the outset.

Revenue tonnage of commercial cargo 1945-1947

With this idea of a free port in mind, it is interesting to make a statistical examination of the revenue tonnage of commercial cargo handled through the Port of Manila from 1945 to and including May 1947. In an article in the American Chamber of Commerce Journal, it was pointed out that for almost a year after its re-opening by the American Forces in 1945, the Port was primarily the logistical springboard for the operations of United States and Allied Forces against Japan. After V-J Day it continued to be the ship-



ping point for men and material moving forward for the occupation of the Japanese islands and of Korea.

It was realized then that it was also essential that the Port be opened to the flow of the civilian cargo necessary to get the rehabilitation of the country underway. Commercial operation was not, however, in full swing until the beginning of 1946.

The opposite chart shows the revenue tonnage of commercial cargo handled up to May this year. An examination of the graph and its basic statistics is of interest from a number of points of view. A noticeable factor is that with the admittedly dilapidated and makeshift transportation, equipment and warehousing facilities a total tonnage over the past 17 months of 2,171,355.60 tons has passed through the Port into the hands of consumers. This amounts to 4208.5 tons of goods per day, or 175.3 tons an hour for every hour of previous year and five months. It must here be stressed that this has in no sense been a regular flow of cargo but rather one that varied widely from month to month. These variations are easily explainable. The year 1946 began with a rapid climb from 82,303.75 tons in January, to 140,659.13 in March. Labor difficulties in the United States in the winter of 1945-46 readily explained the drop noted in the month of April, and the release of vessels is traceable by the sharp rise in May. The next low points on the chart occur in October and November, which marked the maritime strike in America. The break in the backlog of shipping from that strike is shown in the January, 1947, peak. Since then there has been a steady drop toward the mean line which is set at an average of the total for 17 months at 127,726.80 revenue tons.

Variations are easily explained

With the warehouses of Manila as well filled with consumer goods as they are now, and with the difficulties of procuring heavy equipment and construction supplies from the United States, the curve may be expected to cross the average line and drop to around 90,000 tons a month in the near future, eventually rising again and levelling off at about 120,000 tons a month.

Warehouses of Manila well filled

Surveys Needed

In conclusion, it must be stressed that the broad program of industrialization of the Philippines urgently calls for the immediate and complete survey of all possible sources of raw materials, especially the non-metal groups. A salient pre-requisite for reparation claims, according to SCAP directives, is the claimant nation's submission of proof that sufficient raw materials are available to insure immediate operation of the plants. The importance of discovering the local sources of raw materials is established for the following reasons:

Dependence on foreign markets

1. Dependence on foreign markets for raw materials which are presently available will create a weak economic structure and may prejudice a successful operation of any proposed plant.

Manufacturing costs will be high

2. Manufacturing costs will obviously be high compared with those of foreign countries and the industry will undoubtedly encounter the threat of foreign competition.

The proposed basic chemical industries, especially those included in the 5 per cent ad interim reparations, such as the caustic soda, sulphuric and soda ash plants, demand large quantities of salt, sulphur, pyrites, limestone and fuel. The much needed fertilizer plant demands gypsum and phosphate rock. Up to the present time, deposits of most of these raw materials have not been definitely located although there are indications that substantial deposits exist.

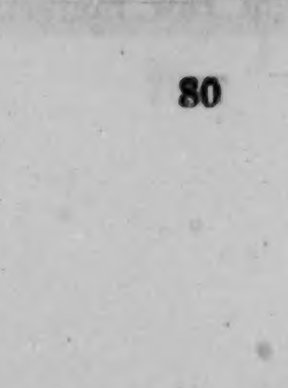
Recommended that surveys be made immediately

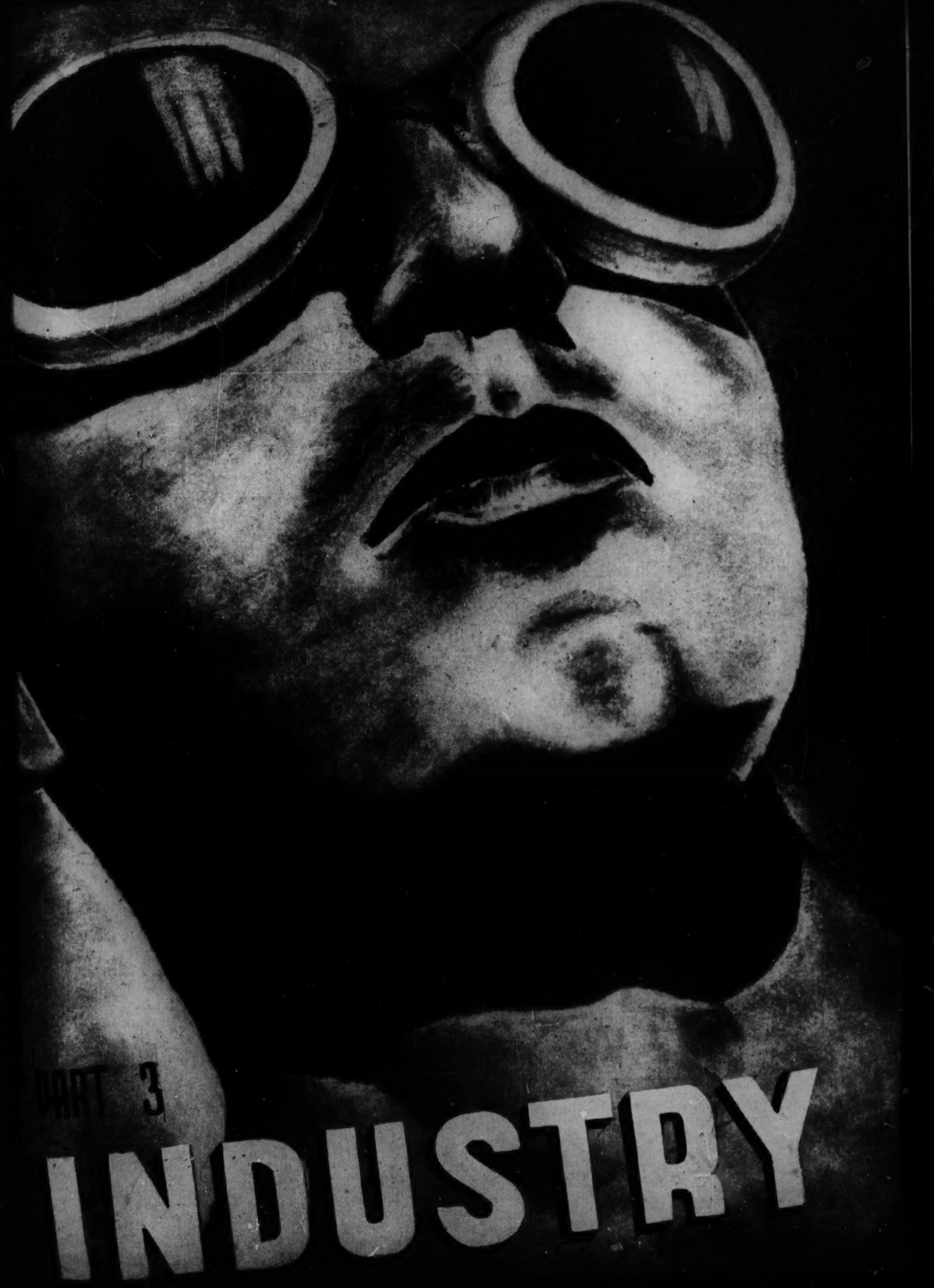
Information recently received reveals that at least 1,000,000 tons of pyrite are available in Panay; sulphur in Davao and Negros; phosphates in Palawan and Leyte; salt in Nueva Vizcaya and Cotabato; gypsum in Batangas, Camarines Sur and Zamboanga. It is therefore recommended that surveys be made immediately to determine the extent and quality of these deposits.

Coordinated surveys could be handled by the following Government entities:

1. National Development Company Technical Staff
2. Bureau of Mines
3. Bureau of Science

An appropriation of a revolving fund of ₱200,000 is believed sufficient for the completion of the initial surveys.





PART 3

INDUSTRY

accent on INDUSTRY

THE UNITED STATES gave the Republic of the Philippines its national independence over one year ago but her final obligations are still in the process of fulfillment. Here in this new-born democracy is a young and sturdy nation that has every indication of a brilliant future. Although it suffered severe war damage and despite the fact that Manila was one of the most completely devastated cities in the world, the young Republic has abundant dollar resources, one of the most stable currencies in existence at the moment, and highly valuable export products now in strong demand. These valuable assets provide the means through which rehabilitation and reconstruction can be achieved. In themselves, they present a wonderful opportunity for the development of a strong and self-reliant economy in the future.

This favorable situation is the result of a series of unusual circumstances. Philippine receipts from all sources during the next five years may conservatively be forecast to exceed $500,000,000 per year as compared with a prewar average from 1938 - 1940 of $200,000,000. During the first post-war years, United States Government payments will account for the greater part of these receipts, but beginning with 1949, these will fall off sharply and by 1951 will be of minor importance.

A vigorous program of rehabilitation and reconstruction in Philippine export products should offset this decline, however, particularly during the years of strong world demand and high prices for Philippine goods."

As early as 1939, plans had already been begun in anticipation of the problems expected to arise after independence. However, these preparations were cut short by war and the effects of war's destruction. Now, from the dust and rubble, a new Philippines is gradually emerging.

Nevertheless, the Republic is not yet in a position to go ahead on its own. It is dependent to a large degree on outside help. As has already been pointed out, it is obvious from the start that there is not enough private capital in the Philippines to think of attempting the tremendous task of reconstruction and industrialization that lies ahead without aid from the Government and from foreign investment.

In this modern age it is essential that the Philippines should turn from a basic agrarian to a balanced agricultural and industrial economy. It must concentrate now on the vast untapped wealth of its resources to expand into an industrial nation. Obviously such a miracle of expansion cannot be achieved in a short time. It cannot be accomplished overnight. Time in itself, however, is not enough. The Philippines looks now to the United States for financial and technical assistance. American "know-how" is admittedly the best in the world today and it is essential that this should be called in to shape the industrialization of the Republic.

The United States experienced the greatest industrial expansion in any five year period of its history during the World War II between the years 1940-1945. Over $25,000,000,000 were expended in new plants and equipment, and industrial production leaped more than 100 per cent. The Philippines, standing now on the brink of industrialization, can look to no better guidance than from America.

There are numerous instances where a nation has moved rapidly towards prosperity through the introduction of foreign capital. A prime example of this is Argentina, which has been raised to the rank of an important exporting nation by capital which came largely from Great Britain and the United

States. Money from Great Britain built the country's railroads. The United States and Belgium invested in the telephone, radio, light and gas companies.

In the case of Brazil also, industrial investments in the past have been made for the larger part by foreign business. The capital represented by old Brazilian families has been conservative and inclined towards agriculture or pastural expansion. Now, however, the whole mental attitude of the people of Brazil is undergoing a complete reversal that will adapt them to a split economy embracing industrial as well as agricultural occupation. In recent years, Brazil has imposed federal controls over production in order to promote industrial diversification. A Council of Industrial and Commercial Policy was formed in 1944 to aid in the promotion and operation of basic industries, improvement of transportation facilities and the amelioration of living conditions. But it must be noted that the restrictions operating against the foreign businessman and his capital are definitely retarding Brazilian industrial development.

In Mexico too, a Mexican-American Industrial Commission was formed to foster an orderly development of various industrial programs in power, steel, cement, rubber, textiles, sugar, chemicals, alcohol, pulp and paper. Coordinated long-term programs of basic industrialization have been outlined by the Commission. Within two years after its conception, the joint commission approved plans for 58 projects, and it should be noted that the program is receiving the financial and technical assistance of the United States. Mexico in the coming years will constitute an increasingly important market for United States capital goods.

The principal factor determining a country's potential for industrialization is the market for the goods it produces. The Republic possesses this prime requisite to a future manufacturing economy. Once its industries are keyed to the natural mineral wealth of the Archipelago, the country can elaborate its expanding industrial structure to achieve a high degree of natural self-sufficiency.

The industrialized countries of the world are to a large degree in a position to select the nations from which they are going to buy. They will naturally tend to buy wherever they can arrange for the best exchanges. Here again the Philippines is in a strong natural position. It has a tremendous advantage over any other country in the Far East.

The Republic is also well provided to cope with the fact that an increase in manufacturing activity must be paralleled by a development in transportation. There is here a well-developed transportation system to allow for the domestic distribution of industrial products. The significance of this cannot be overlooked.

The principal handicap to industrial development in the Philippines today is the lack of workmen with specialized skills. This can primarily be offset by an influx of skilled American technicians, while the proposed program for industrialization calls for educational programs in these fields to accompany the growth of industries in order to develop a skilled supply of labor in the Islands.

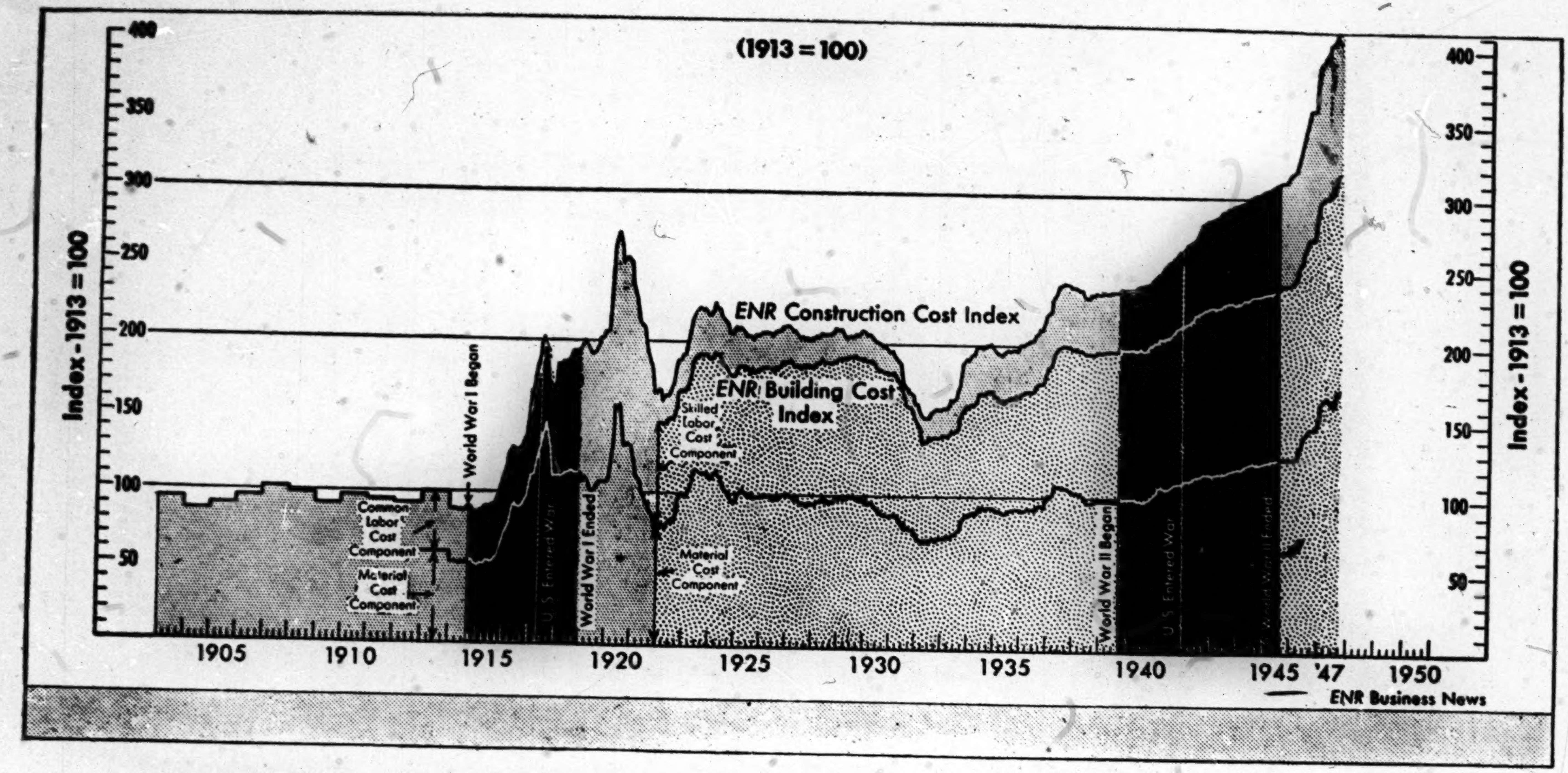
"Industrialization" is a term that covers the productive capacity of an area or population group. It presupposes three things—technological knowledge and skills, manufacturing establishments and mineral resources, and finally, a consuming market for the goods produced. The mineral resources are here in abundance and there is also a market for the goods. Plans are under way for the establishment of manufacturing plants, and already the influx of foreign technical assistance has started. President Manuel A. Roxas announced in October, 1947, that a new electrical plant will be established here in accordance with the plans submitted by the Westinghouse Electric International Company, whereby American know-how will be used in conjunction with Philippine labor for the birth of a new industry in this nation. For the first time in its history, the Westinghouse Company has offered the use of its rights and patents in the manufacture of electric bulbs to outside interests. In addition to this, a number of Philippine technicians will be sent to the Westinghouse plant in America in order that they may be trained to take over full control eventually of the actual running of the installation here.

The inauguration of this new electrical supply plant marks the first step in the industrialization program that has been proposed for the next 15 years. It will be but the first of many new installations that will spring up in these Islands to promote the emergence of the Philippine Republic as the hub of Pacific trade.

Any long-range program of international trade must be based upon reciprocity of buying as well as selling. In a free economy such as the Philippines possesses, foreign trade is carried on by individuals as well as the nation, with advantage to both buyer and seller taken for granted and with profit as the acknowledged motivating cause. Mutual benefits fully justify the application of time and thought to the cultivation of international commerce.

The contribution that foreign trade makes to international welfare and prosperity is one of the greatest influences toward lasting peace.

The industrialization of the Philippines can be accomplished, but it requires hard work and close cooperation between government-management-labor. This is the biggest moment in the history of Philippine labor and it is essential that every man shall work with a deeper sense of responsibility toward the development of the country.



Engineering News — Record Construction and Building Cost Index Trends — September, 1947.

Greater production means greater sales, which in turn mean an improvement in living conditions through a lowering of living costs. It is only through production that conditions in the Philippines can be improved and stabilized.

The independent movements which have taken place in the Asian nations such as Burma, India, Indonesia, and French Indo-China, mark a complete breakaway from the controlled economy exercised by the colonizing power, thus establishing the commerce and economy of these countries on a free trade basis whereby they must compete using a higher standard of wages and living. As already pointed out on page 54, the Philippines would be in a far more advantageous position providing it makes full use of the abundant opportunities at its disposal in the immediate future. Once the stability of the colonizing power is thrown off with the gaining of complete independence, the immediate reaction is one of extreme nationalization and the resultant internal pressure to gain the advantages of an improved standard of living at once becomes apparent. This desire naturally forces the value of goods and services produced to a higher level. The Philippines, being far more advanced along the road to this standard, is in an extremely advantageous position at the moment.

The vast potentials of these 7,000-odd islands have been pointed out and the abstraction of the nation's economic growth has been visualized. The accent now is on industry, for the industrialization of the Philippines is one of the principal factors in the rebuilding of the nation and its primary economic independence.

In the following pages an overall view is given of the industrial possibilities awaiting expansion.

But it must be emphasized once again that changing market conditions will necessarily affect capital requirements and returns of all industries as listed. However, the cardinal theory in this presentation is to establish the productive rate for each industry and to indicate an estimated cost in accordance with the present day prices.

The chart on the opposite page brings out the fluctuating trends of building and equipment cost in the United States which generally can be accepted as a guide to what the future may hold insofar as costs are concerned.

The current and potential situation in the United States can be reasonably expected to have its reaction in the Philippines.

METAL

METAL IS THE framework of modernization. Today, the consumption of steel and iron is a tangible expression of a country's industrial activities. Iron ore deposits have come to be the yardstick of the industrial potentiality of a nation. The tremendous magnitude of these two metals in the industrialization of the Philippines cannot be over-stressed and the Republic is fortunate in having in the Surigao iron deposit one of the largest of its kind in the world.

The establishment of an iron and steel industry is vital to the healthy industrial and economic development of this country. In the industrialization program, steel will be an indispensable commodity, and its manufacture will constitute the basic industry upon which other proposed industries will depend.

Record demand for steel

The rapid rehabilitation of pre-war industry and economy relies extensively upon steel for the necessary physical reconstruction. As a result of the record demand for steel throughout the world today foreign producers will be able to supply only a small fraction of the country's immediate requirement.

Basically, the idea of establishing a steel mill in the Republic is fostered on the tendencies of any country having resources of iron ore being inclined to think in terms of producing its own steel requirements. This latter instance can be cited in the case of Mexico, Brazil, China and other countries throughout the world whose natural boundaries contain such resources or are in close proximity thereto.

History of steel in Philippines

The history of steel in the Philippines has been mainly centered on the fabrication of steel imported from the United States or Japan and the production of gray iron castings. Principally, the country has always imported finished steel products and no marked increase in the importation of these products was noted until the decade prior to the last war. These steel commodities were very diversified and the total quantity in a volume not comparable with the capacity of integrated steel plants found in highly industrialized countries such as the United States, England and Japan. This combination of many types of products and the small tonnage made it rather difficult to design a simple and inexpensive plant which could meet the needs. Prior to the Japanese invasion of the Philippines, this subject was carefully studied by Mr. S. M. Marshall, Consulting Engineer, who submitted his memorandum June 23, 1939, to the Philippine Commonwealth.

However, the brief information contained in this report presupposes and projects that the reconstruction and new building needs of the Republic will be far in excess of that imported during the pre-war years. The required production capacity would, therefore, establish such a plant as supplying the domestic needs of the country on basic sections exclusive of heavy plate and heavy structural sections and other products, which, it is believed, can be produced at lower cost and shipped to the Philippines in competition with rolling facilities in the Islands. Generally, the average unit cost of imported materials is higher than that which could be obtained from an integrated domestic plant well equipped and efficiently operated. With such low prices, domestic uses would be stimulated and the demand should rise steadily with the industrial development that cheap steel would initiate. Therefore, plans for the proposed mill must visualize expansion, and the construction must be such as to provide opportunities for growth without the need for changes in the equipment and for the rearrangement of units. It may be pointed out that the rated capacity of the equipment desired may be considered much greater than that required, but it is believed that over-capacity in rolling mills in any steel plant is normal and desirable.

New building needs far in excess of those of the prewar years

Must visualize expansion

Demands for products will be variable

Demands for many products will be highly variable and the different sections are usually made at widely different daily rates. Mr. Marshall, in his report, stated that the hourly capacity upon average section must exceed the hourly output divided by the yearly operating hours in order that peak loads may be carried and light sections rolled with economy. This will entail higher investment costs per ton than found elsewhere, together with reduced operating schedule and some sacrifice in operating costs.

These facts, however, will not constitute great hardship if the plant will meet the requirements of the country and will enable the Republic to be nearly or quite self-contained for its steel requirements. At the same time, it is estimated that within a few years the market will grow to a point where the surplus capacity will be absorbed. In view of this, there is ample justification for the establishment of a small mill in the Philippines even though there may be some consideration of the fact that initial operating costs may be somewhat high as compared to the United States practices. Thought must be given, however, to the future trade relations of the Philippines, particularly with that of the United States, where after 1953, the Bell Trade Act permits the imposition of 5 per cent duty progressing for 20 years on all imported commodities from the United States. This duty, will in some measure, protect industry in this country and permit production on a competitive scale with imported commodities.

As of October 1, 1947, the United States has re-imposed export restrictions on basic steel commodities which limits by allocations the import of this commodity into the Philippines and other nations. Thus, only local production of steel can insure reconstruction within a reasonable period of time.

U. S. re-imposed export restrictions on basic steel

Authentic estimates have placed Philippine iron ore reserves as ranging between 11,000,000 and 22,000,000 tons of 60 per cent or more iron, and approximately 1,000,000,000 tons of lateritic Surigao ore which averages 47.76 per cent iron, as mined, and 70 per cent iron on the dry basis.

In the Surigao iron ore deposit, which has a reserve of approximately 1,000,000,000 tons at 47.76 per cent, the Philippines has one of the richest undeveloped potentials in the world. The actual known reserves of iron ore at 60 per cent iron content or better in six mines are given as between 11,000,000,000 and 22,000,000 tons.

One of the richest undeveloped deposits in the world

The vast Surigao deposit is a tremendously important factor in the industrialization of the Republic. This lateritic iron reserve was first discovered by H. P. Cameron, Chief Engineer for the Department of Mindanao and Sulu, in 1912. According to unpublished data, Cameron was sailing along the Surigao coast when he first noticed the red hills rising steeply from the shore. Having seen the famous laterite deposits of Cuba, he sensed that this must be a deposit of similar nature and took several samples of the red soil, which he submitted to the Bureau of Science for analysis. The results showed that the ore was very much the same as that found at Mayari, Cuba.

In 1914, the iron reserves of Surigao were estimated to be somewhere in the neighbourhood of 800,000,000 tons, but this figure was not based upon any field evidence and was only a guess. The following year, however, the Bureau of Science sent Wallace. E. Pratt and Victor E. Lednicky to Surigao to make a field study of the deposits. In their report they stated that the reserves cover an area of approximately 100 square kilometers with an estimated tonnage of 500,000,000, of which 430,000,000 might be mined, including 275,000,000 tons within a comparatively short distance from

Bureau of Science makes field study

points on the coast at which mining might be carried on. Analyses of these samples showed the ore to run 13.5 per cent hygroscopic water, 6.65 combined water, 1.04 silica, 10.56 alumina, 66.80 ferric oxide, together with a trace of sulphur and phosphorus. Nickel oxide was reported as absent.

After this survey had been completed, the Bureau of Science was of the opinion that the Surigao deposits were not ready to be exploited. It was felt that other known iron deposits in the Far East were in a much more favorable position for exploitation and that the Surigao ores would not be able to compete on the open market. Certainly the Philippine industrial demand did not justify the opening of the deposit in 1915.

Laterite bodies in Central Celebes discovered in 1921

During 1921, Dutch geologists reported the presence of iron laterite bodies in the Central Celebes and in the vicinity of Strait Laut and north-eastern Borneo. These deposits were said to be of a similar nature to the Cuban and Surigao ores and at the time it was thought that they would cause a material change in the ore market in the Far East and that the chances of a large market for the Surigao ore would be greatly reduced. As a result of Dutch activity, the Philippine authorities in the Bureau of Science considered the future of the Surigao deposits as being unfavorable.

Accordingly, nothing of importance was done with regard to this area until the fall of 1936 when some Japanese interests were allowed 2,700 tons of ore for metallurgical tests. A year later the newly organized Bureau of Mines carried out a preliminary survey which later developed into a detailed mapping and drilling program. This exploration program was divided into two periods. The first was from the middle of October, 1937, to the middle of February, 1938; while the second began at a later period and terminated on June 15, 1938. The exploration was carried out by Dean F. Frasche, Chief of the Geological Survey Division, and by George H. Kemmer, Resident Engineer.

Excellent natural harbor provided in Dahican Bay

Their survey showed that although the east Surigao coast is comparatively rugged, an excellent natural harbor is provided in Dahican Bay, which is protected at all times during the year, having land barriers on three sides. In depth the Bay varies from six to 29 fathoms, the most shallow part being found along the edges where the fringe reefs have grown. These coral reefs vary in width and at low tide their platforms are bare. There is ample room in Dahican Bay for large freighters to maneuver in, and there are several locations where docks can be constructed to receive these ships.

The climate of the eastern Surigao coast is divided into wet and dry seasons, the wet season occuring from October to April, the dry taking up the remainder of the year. In the vicinity of Dahican Bay, the climate is ideal for a mining camp or town, the days being warm and the nights, in general, cool.

Climate of east Surigao coast

The eastern part of the reservation is comparatively barren of vegetation, but timber can be obtained at the foot of Mount Legaspi.

The most prominent topographic feature of Surigao province is the Diwata Mountain range which forms the western border of the area. To the west of this mountainous chain is the Agusan Valley, through which the northward flowing Agusan River winds its way to Butuan Bay. On the east, isolated mountain peaks cut the horizon and taper off into small ranges. In the south the province is flat and spacious in comparison to the central and northern sectors. In general, the land slopes eastward toward the coast and is chequered by the eastern flowing drainage channels. To the north and east of Mount Legaspi it is deeply incised. It is in this lower area east of Mount Legaspi that the large Surigao lateritic iron ores are to be found.

Upon these slopes occurs a wide spread of lateritic iron deposition in blanket form varying in thickness. This blanket deposit rests directly on a basement complex of serpentinized ultrabasic rocks.

Lateritic iron in blanket form

The rocks of the basement complex are represented in their order of abundance by serpentines, peridotites and metamorphosed diorites and andesites.

The entire basement complex is extremely fractured and faulted. The magnitude and importance of faulting has yet to be determined. It is believed that only after more detailed field work has been carried out on the structural and stratigraphic relationships between the basement and the western highland can formations be determined.

To determine the possibility of the Surigao iron deposits, it is necessary to compare their mode of origin with those of the Mayari deposit in Cuba. It should be noted that both deposits originated from the sub-aerial decay of serpentine and basic rocks through a process known as laterization. This process is rather common in the tropics with their abundant rainfall. Under these conditions, the leaching of magnesium, silicon and lime are partially effected, leaving a residual clay high in iron, alumina and moisture, with appreciable amounts of nickel and chrome. This constitutes the primary

Comparison with Mayari ore

change. In the secondary change, the brown residual clay is changed to the red variety, mainly because of partial dehydration and deoxidation.

Surface deposit

The greater part of Surigao ore is made up of soft, extremely fine, ferruginous clays, consisting mainly of limonite ($2Fe_2O_3 3H_2O$) and hematite (Fe_2O_3), with subordinate amounts of magnetite ($FeO\ Fe_2O_3$). The limonite zone is made up of fine, compact, wet yellow to brown clay which rests upon the serpentine bed rocks. This lower zone varies in thickness from narrow bands to many meters in thickness. Overlying this yellow zone is a bright red surface deposit consisting of hematite containing scattered crystals of magnetite.

The Surigao ores are made up mostly of limonite containing some hematite, magnetite, and intermediate hydrates of iron. The ores average approximately 47 per cent metallic iron, but in local areas they vary and as a general rule they tend to decrease toward the surface and slightly increase toward the bottom. Hygroscopic water averages between 25 and 32 per cent and the combined water 13 to 14 per cent. Phosphorus is in general below the Bessemer limit. Nickel is present up to plus 1 per cent and averages about .79 per cent throughout the drilled area. The presence of nickel would be advantageous to the quality of steel produced from the ores. Chromium averages 4.09 per cent, the higher percentages being found near the middle and lower zones in vertical section. Under correct metallurgical process this can be removed economically.

Principal impurity is alumina

The principal impurity is alumina, in the form of bauxite, and kaolin. Although the alumina averages 8.17 per cent it presents no smelting problem. Bauxite increases toward the surface in the ores.

The surveys have proven, or blocked out, approximately 17,000,000 tons of iron ore which can easily be mined by open pit methods near the foot of the Dahican Bay area. These and other preliminary surveys and sampling carried out in the interior of the reservation show that many hundreds of millions of tons of iron ore exist here. This enormous iron deposit should be mined as soon as possible.

In addition to the iron, some evidence of nickel, chromite, and bauxite have been found associated with these ores. Although they contain nickel and chrome it is possible for these two important strategic metals to exist in separate bodies and to be of commercial importance. It is recommended that geological studies be continued in the reservation in order to ascertain if such ore bodies do exist.

During the primary change, the alteration of serpentine to iron ore, large pore-spaces developed in the ores. This was due to the removal of certain constituents in solution. These pore-spaces are more or less filled by hygroscopic water. Such porosity can be explained by the fact that leaching has taken place, leaving many extremely small and irregular pores. This is a very significant factor to consider in the preparation of the ore for smelting.

Significant factor in preparation of ore for smelting

On the southern part of Dahican peninsula alone, 17,000,000 tons of ore have been blocked out and await mining. It is believed that the overall ore-reserve will reach the amount of 1,000,000,000 tons.

The average analyses of Surigao ores (natural condition) is as follows:

Average analyses of Surigao ores

Total Sample	Analysis	Average	
11	Hygroscopic water	31.02	
1,128	Combined water	13.79	Includes 86 composite samples
1,151	Fe	47.76	-ditto-
512	SiO_2	1.08	"
244	Al	4.61%	"
1,139	Cr.	2.80%	"
874	Ni	.75	"
238	P.	.027	"
250	S	.21	"
18	Mn	1.26	"
5,565	Total Determination		

It appears that the main deterrent with regard to the possibility of Surigao ores as a source of raw material in the manufacture of steel products is the presence of nickel and chrome. There have been many reports written regarding the inadvisibility of this ore for use as raw material in blast furnace operations. Japanese engineers reported in 1940 that it would necessitate a special type of furnace to melt Surigao ore.

The Cuban deposit, known as Mayari ore, is in many respects similar to that of Surigao. Mayari has for many years been the

Mayari ore

principal source of the Bethlehem Steel Corporation and its predecessor and present subsidiary, the Maryland Steel Company. On this count there appears to be no reason why Surigao ores cannot be equally useful in the manufacture of steel products. For example, Mayari is used in the manufacture of rails, structural material, and bars, which indicates the possibilities of Surigao ores.

A representative analysis of the Mayari ore is as follows:

Representative analysis

Fe	41.00%
SiO_2	3.00%
Al	9.35%
Cr	1.50%
S	.13%
Ni	.70%
P	.013%
Combined water	11.00%
Moisture	27.50%

Comparing the two types of ore (Surigao and Mayari) for nickel content, the difference is .05 per cent and for chrome, approximately 1.30 per cent. The presence of this metal in appreciable quantity is detrimental in the operation of the open hearth process, but this can be readily overcome by duplexing. For metallic iron content, Surigao ore is even higher, by 6.7 per cent.

A report of the Bethlehem Steel Corporation on their Cuban property, concentrating on ore preparation, (drying and nodulizing) blast furnace practices and steel making is believed to be important and applicable to the Surigao ore.

Bethlehem Steel report on Mayari

According to the Bethlehem Steel Corporation's report, if a steel making operation based on Mayari iron were to be carried on today at a sufficient scale to justify duplexing it would be possible to produce an iron low enough in silicon so that the combined heat of silicon and chromium would not be execessive. If the blast furnace slag necessary for this result failed to eliminate sulphur sufficiently, residual sulphur could be eliminated in the blast furnace ladle by the well known Corby process. Finishing the heat in the open hearth would then be free from any difficulties caused by chromium. Nickel presents no difficulties in the melting process and need not be considered in that connection.

Considering the Surigao ores as a basis for steel making it is believed that it will be evident that certain qualities in steel will

Steel improved by presence of nickel

be sacrificed if ores containing nickel form the basis of manufacture. The qualities which will suffer are those included in the United States under the name "formability". On the other hand, the strength of the steel will be improved by the presence of nickel.

In a country having as highly developed a manufacture as the United States, according to a report issued by the Battelle Memorial Institute on "The Beneficiation of Surigao Iron Ore" in 1939, great variety of uses must be fulfilled and a great variety of specifications must be met. These conditions require that every constituent of the steel be varied to suit the nature of the use, and an unvarying content of any alloying element prevents the satisfactory filling of this wide range of specifications. An ore or pig iron like Mayari or Surigao would therefore, in the United States, be more useful as a special product capable of mixture with other ores or irons in the manufacture of a special steel than as a base material for the manufacture of steel generally.

With regard to pig iron for foundry purposes, the objections to nickel and chromium are very much less. Their proportions as they exist are not suited to all classes and conditions of castings, and Mayari iron is used in the United States as a part of a mixture and seldom or never by itself.

Experience at Bethlehem indicates that there is not much difference in the performance of the furnace whether the alumina in the slag is 23 per cent or 29 per cent or any intermediate percentage. For example, where a high percentage of Mayari ore is used, the desirability of making the least possible slag results in a high percentage of alumina. Slag of the composition described is sufficiently fluid to handle well in the blast furnace runrunners, provided the silicon in the iron is kept above one per cent.

There is no greater difficulty in applying high blast temperatures to the working of Mayari ore than to other ores. According to the report of the Batelle Institute, Bethlehem habitually uses from 1,200°F. to 1,400°F. in the production of Mayari iron.

Rail steel made from Mayari ore

The Maryland Steel Company, which was later merged with the Bethlehem Steel Company, undertook for a number of years the manufacture of rail steel from straight Mayari iron. For this purpose, the duplex process was chosen, the plant consisting of three 15-ton Bessemer acid converters, a number of cupolas, and five 50-ton tilting open hearth furnaces.

The chief characteristic of steel made from Mayari or Surigao ore is the presence of nickel. Chromium may be eliminated

Nickel content depends on ore percentage

in the steel making process to a point where the residue in the steel is not important. The nickel content depends on the percentage of the ore used in the pig iron and on the percentage of pig iron used in the charge. With 100 per cent of Mayari or Surigao ore used in the blast furnace and re-use of scrap produced in working this pig iron, there will be a nominal slowly cumulative increase in the nickel content. However, the maximum probable content in the ingot will be about the same as that in the pig iron—that is, from 1.2 to 1.4 per cent. Chromium in such percentages as are usually employed will require to be added. The problem, therefore, is with regard to the use of steel which inevitably contains nickel in proportions similar to the proportion existing in the pig.

Bethlehem Steel blends Cuban ore with other ores, but in the case of Surigao, would use mainly Surigao ore without opportunity for the same degree of blending.

Bailey methods of reducing iron ores

According to a treatise by Thaddeus F. Bailey, of Canton, Ohio, regarding the "Method of Reducing Iron Ores", the Bailey invention contemplates a method for the reduction of such ores containing nickel oxide and chromium oxide, for instance, in which is recovered substantially all of the nickel and part of the iron as a nickel iron alloy, the percentage of nickel in the reduced metal depending upon the amount of iron reduced.

According to Bailey, the remainder of the iron, as iron oxide, together with the chromium oxide, or other oxides less readily reducible than iron oxide, combine with the gangue of the ore forming a fusible slag with the addition of flux if required. This slag may then be processed to recover the iron and the chromium or other metallic oxides less readily reducible than iron oxide forming a chrome-iron alloy.

The treatise states that by using sufficient reducing agent to reduce only a portion of the iron and all of the nickel or cobalt oxides, leaving a portion of the iron unreduced in the slag, it is possible to produce a nickel cobalt, iron alloy low in other alloys such as chromium, manganese or vanadium and to take off a fluid slag containing the remainder of the iron and the other metallic constituents in oxide form. By varying the amount of reducing agent used in the process it is possible to produce a nickel iron alloy containing from two per cent to 16 per cent nickel from an ore containing one per cent nickel, 2.5 per cent chromium and 50 per cent iron, the chromium content being as low as .02 per cent.

And by varying the temperature at which the reduction operation is carried on, control of the carbon content from as low as .02 per cent to above 2 per cent without reducing any chromium is possible.

Bailey points out that if the operation is carried on at a high temperature required for the production of low carbon steels, and with insufficient carbon to reduce all of the iron, the product will be a low carbon nickel iron alloy, low in chromium; while if the operation is carried on at the temperature at which pig iron is fluid the product may be a high carbon, low chromium, nickel iron alloy. The slag resulting from the nickel iron reduction operation may then be treated, while still fluid, so as to produce metal containing the balance of the iron and all of the chromium, or other metallic oxides remaining in the slag. It will thus be obvious that it is possible to produce two distinct iron alloys from ores which, when processed by the usual methods, would produce alloy pig iron containing substantially all of the metallic constituents in the ore, in the proportions in which they occur in the ore.

Slag may be treated while still fluid

Thus, by utilizing the improved process, ores of the character above indicated, of which there is almost a limitless supply, can be advantageously processed to provide the nickel required for the production of nickel steels of any desired nickel analysis from 1.5 nickel to stainless grades, and it will be further apparent that this nickel can be obtained by a simple metallurgical operation.

It will thus be seen that, by the use of this improved method, these ores are made useable, both the iron and nickel being recovered in such form as is desirable for the production of all grades of nickel steels. Meanwhile, the other metals, such as chromium, manganese, and vanadium, contained in such ores, may be recovered as ferro alloys free from nickel by processing the slag from the nickel iron reduction operation.

Advantages of improved method

Here in the Philippines, it is believed that more deposits of iron ore can be located if extensive exploration work is performed.

The cost of electrical energy is an important item in the operation of a steel plant. The proposed Maria Cristina hydro-electric plant will produce electricity at less than 1.5 centavos per kilowatt-hour according to an estimate of the National Power Corporation. This rate compares favorably with the rates borne by steel plants in other countries.

The proposed steel plant will require large quantities of coal, particularly coke. Most Philippine coals are non-coking by the

Will require large quantities of coal

standard processes of coke making. However, reports indicate that the American Cyanamide Company has invented a new process whereby good quality coke can be produced from so-called "non-coking" coals. If this process proves impracticable, charcoal can be mass-produced at reasonable cost, especially considering the superiority of charcoal pig iron.

Establishment of two steel plants is recommended

The general plan calls for the establishment of two steel plants in the Philippines, one in the vicinity of Iligan, Lanao, and the other in the Manila area. The two plants should have a combined capacity of about 150,000 tons of steel annually. The main production of iron and steel and the fabrication of heavy products are planned for the Iligan unit; the manufacture of electric steel from scrap and the fabrication of light steel products is to be accomplished in the Manila plant.

Favorable aspects of Iligan vicinity

The vicinity of Iligan, Lanao, has many favorable aspects:

1. It is very accessible by cheap water transportation.
2. It has a good harbor, a deep sea frontage, and is beyond the reach of typhoons.
3. It is near the immense iron deposit of Surigao and economically proximate to all iron deposits throughout the islands.
4. Raw materials can be assembled here most advantageously.
5. It is located very near the proposed Maria Cristina hydroelectric project, upon which the steel plant will depend for approximately 250,000,000 kilowatt-hours per year.

Manila considered ideal site for nail factory

Manila is considered an ideal site for the fabrication of nails, wire products and other light steel manufactures for here a continuous supply of electric furnace scrap can be assured. There is also an abundant supply of labor. Moreover, the demand requirements for light steel products are subject to fair degrees of fluctuation as to sizes, gauges, finish, etc. In Manila, the industry can be more sensitive to the market demand considering the fact that this city is the market center of the nation.

The determination of desired production capacity has been given careful and detailed study. War damages, depreciation of existing structures, anticipated reconstruction and expansion of pre-war structures, new construction based on proposed industrial expansion, expected rate of construction, pre-war imports of iron and steel products and population increases were among the factors considered. It is felt that the following comparative figures quite accurately predict the requirements of the eight steel products considered to be of greatest importance.

Desired annual production

	1 9 4 0 Imports (Tons)	Desired Annual Production (Tons)
Steel Rods & Bars	33,983	24,000
Sheets:		
Corrugated	6,250	11,000
Plain	6,250	11,000
Angles & Channels	3,878	6,800
Beams	597	1,000
Round Wire	2,246	3,900
Wire Nails	9,563	16,700
Nuts & Bolts. Washers	2,025	3,500
Steel Pipe	7,516	13,200
Total	79,715	139,600
Cast Iron Pipe		15,912

The production capacity was designed to conform as closely as possible with the above desired annual production and the output was distributed among the eight most important steel items accordingly.

Although no definite allocation of Japanese iron and steel plants has been made as part of ad-interim reparations, nor have specific claims for such been requested or submitted, the following percentages of available reparations equipment are required to produce the desired capacities discussed herein:

Percentages required

Blast Furnace	6.2%
Open Hearth	7.0%
Electric Steel	7.0%
Rolling Mills	7.1%

The following capital requirements are based on the receipt of the above-mentioned items of equipment from Japanese reparations. In the event this equipment is not forthcoming, all capital requirements must be based on the purchase of new equipment.

Fixed and Operating:—		
Steel Plant	₱46,330,000	
Charcoal Plant	18,350,000	
Ipil-Ipil Plantation	6,190,000	
		₱70,870,000
Reserved		47,852,000
Total		₱118,722,000

The sizable reserve capital includes ₱10,000,000 for contingency and ₱37,852,000 for operating capital reserves. It should not be construed, however, that losses will definitely be incurred. This amount of reserve capital is calculated to provide for the poorest operating conditions and other contingencies.

Fixed capital may be reduced

The fixed capital may be reduced about ₱20,000,000 if the National Process for Coal Carbonization can be adapted or some cruder charcoal-making equipment can be employed.

Profit & Loss Statement:

Estimated Sales	₱27,745,000
Estimated Cost	21,058,000
Estimated Profit	₱ 6,687,000

This estimate was based on normal plant operation exclusive of the initial training and adjustment period inherent to all new plants.

On Estimated Fixed & Operating Capital	9.5%
On Total Capital including Reserve	5.9%

Iron Foundries

Vital necessity for Industrialization

A vital necessity for Philippine industrialization is the production of inexpensive, good quality grey iron castings, which are essential in the manufacture of machinery and repair parts.

The tremendous demand for cast iron pipe alone is sufficient to support this industry. The country's import of cast iron pipe and pipe fittings in 1940 was 15,911 tons valued at ₱1,791,853. The present requirements for these indispensable items are many times greater than these figures.

Abundance of iron should be great inducement

The abundance of iron, which constitutes the principal raw material in the manufacture of iron castings should be a great inducement toward the establishment of this industry. In addition, limestone, charcoal, and minor raw materials are also available in great quantity.

Present facilities for making iron casting in the Philippines are crude, inefficient and expensive. A kilogram of iron casting costs about one peso in Manila today.

It is felt that a foundry of about 128 ton capacity per 8 hour day should be established in the city of Manila. The capital requirement for a plant of this size is estimated to be ₱1,708,000.

Steel Pipe

Not advisable until P. I. can produce own steel

The manufacture of steel pipe is not considered advisable until such time as the Philippines is able to produce its own steel. Once local steel production is guaranteed, however, this industry can be both profitable and useful.

In 1940 the Philippines imported 10,817 tons of assorted pipe valued at ₱2,477,222. Post-war demands should be very much greater than the 1940 importation.

Once steel production is established, the erection of a plant with a capacity 14,400,000 feet or approximately 10,080, tons of pipe per year is recommended.

C. I. F. Manila price November, 1947

Purchase costs of Pipe C. I. F. Manila price as quoted by local retail dealers, November 1947:

¾" Pipe	₱0.43 per foot
1" Pipe	0.70 per foot

Estimated production costs of steel pipe in the Philippines based on ₱160 per ton of steel:

¾" Pipe	%0.1138 per foot
1" Pipe	0.1476 per foot
Required Capital	₱511,712

Profit & Loss Statement:

Gross Sales @ ₱0.25/kg.	2,300,000
Cost @ ₱0.15/ft. average	2,160,000
Estimated Profit	₱ 140,000

Yield on Capital Investment 27%

Nail Manufacturing

Two most critical items in building

The two most critical items in building construction in the Philippines today are nails and galvanized iron sheets. Other materials such as lumber, cement and adobe stones are becoming more plentiful but the reconstruction of homes and buildings is still severely hampered by the dire scarcity of these two essentials.

The supply of nails is extremely limited because of the huge demand of the American domestic market and of the rest of the world.

The estimated annual requirement of the Philippines for nails has been set at 250,000 kegs. On October 23, 1947, President Roxas ordered the immediate establishment, in the compound of the National Development Company, of a nail factory which will produce about 5,000 tons of nails of various sizes annually. This will be approximately 47 per cent of the annual importation. As can be seen, it will only provide a very small portion of the present demand.

Analysis indicates can be very profitable

An analysis of this enterprise indicates that it can be very profitable. Based upon imported steel wire at ₱380 per ton the total production cost of nails will be approximately ₱0.23 per ton. Adding to this a fair profit, sales tax, transportation cost, etc., a retail price of about ₱0.24 per pound is tentatively established. Present retail nail prices in the Manila area are averaging ₱0.51 per pound.

The proposed capacity for the new nail plant is 100,000 kegs per year. Although less than one half the estimated Philippine requirements, this amount will sufficiently increase the supply to decrease the price of this commodity to a reasonable level.

The Manila area has been selected as the most logical site inasmuch as it is the nation's market center and the plant can fill the demand requirement more adequately.

The establishment of the proposed steel plant will enable the wire requirement of the nail plant to be met.

A financial investigation of this enterprise is as follows:

Capital Requirement	₱823,000
Profit & Loss Statement based on nail sales price of ₱0.24/lb.:	
Sales	₱2,450,000
Cost	2,323,830
Profit	₱ 126,170
Yield	15%

Other critical materials

Other critical construction materials are screws, nuts, bolts, washers and rivets. Prior to the war, in 1940, the Philippines imported 2,026 tons of these items valued at ₱607,490. With the establishment of the proposed steel plant the Philippines will have a local source of steel bars, rods and plates for the manufacture of these products.

The desired annual production has been calculated and set at approximately 3,500 tons.

A plant of this capacity will require an estimated capital of approximately ₱900,000.

Forges

Although there are forge shops located in nearly all parts of the Philippines, they are mostly small and lack adequate facilities for mass production. As a consequence, the prices of finished products are very high in spite of the fact that the cost of scrap metals used as raw materials is very low.

Two localities are noted for special forge products

Two localities in the Philippines are noted for the forge products they produce. These are Lipa, in Batangas, for the manufacture of knives; and Meycawayan, in Bulacan, for the manufacture of bolos.

At present there is an ample supply of raw materials for the operation of a mass production forge plant. As a result of the past war, scrap metals are to be found in ample quantities throughout the islands. It is felt that prior to the time that present stocks are consumed the proposed steel mill will have been in operation and will be capable of supplying the raw materials needed to continue the operation of this proposed forge plant.

Manila selected as site for new installation

Manila has been selected as the site for the new installation. This city has an abundant supply of skilled labor, is expected to have ample electric power, and, being the business center of the country, possesses the necessary facilities for marketing the finished products of the plant.

It is felt that the initial mass production forge plant should have an annual production of 25,000 tons of forge products per year. A plant of this capacity will require an estimated capital investment of ₱3,500,000.

The expected net return on this investment should not be lower than 15 per cent. This return is predicated on an expected selling price of approximately one-fourth current forge product prices.

Sheet Metal

Modern sheet metal plant recommended

Yet another industry that could well be established in the Philippines at the present time is a modern sheet metal plant. The demand for sheet metal products is huge because of the necessity for large scale reconstruction.

Here again local methods are crude, inefficient and expensive. Common sheet metal products are laundry pans, pails, sprinklers, gutters, wick lamps and cans. These products, all of which are in great demand at present, can be manufactured more rapidly, less expensively and of much better quality with modern labor-saving equipment.

A number of possible sites have been selected on the basis of power supply, availability of skilled labor and market proximity. Among the considered locations are Laguna, Cavite, Batangas and Lanao. It is recommended that 10 small plants with a combined capacity of 36,000,000 square feet of sheet metal manufacture per year be constructed.

Owing to the wide diversity of sheet metal products it is hazardous to make an estimate of profit. It is estimated that the capital investment required for the 10 plants will be approximately ₱3,000,000.

Machine Tools

Highly inadvisable project at present

Lack of skilled tool-makers and the necessity of importing tool steel makes the production of machine tools in the Philippines a highly inadvisable project at the present moment. It is considered that the development of this industry should be postponed until such time as the necessary skills are available and when raw materials can be more readily be acquired from abroad, as well as from the proposed iron and steel industry.

When the time is suitable, however, the initiation of a progressive program for the production of machine tools is definitely recommended.

Machine tool requirements of Republic

The machine tool requirement of the Philippines is estimated at 17,000 units. This volume of machine units would permit the establishment of jobbing shops in each of the industrial centers of the Philippines and would provide adequate facilities to small plants and industries whose investment in private shops would not be practical or economically feasible.

The receipt of a certain amount of machine units as the initial part of the Philippine share of Japanese ad-interim reparations is expected some time in the future. This equipment is considered to be of likely value not only to the rehabilitation of the pre-war industry but to the proposed industrialization as well. Although plans for the distribution of the above-mentioned units necessarily must await the receipt of an accurate inventory, the proposed plan envisions the pro-rated disposal of the first echelon to important private industries and to government corporations. The facilities thereby made available will no doubt be felt throughout Philippine industry.

The proposed establishment of jobbing shops throughout the industrial centers of the Philippines is expected to require an estimated capitalization of ₱1,000,000. Twenty-five such shops are contemplated.

Farm Implements

The introduction of proper mechanization will definitely boost farm production in the Philippines. However, it is considered essential that the innovation of such mechanization be considered in a practical light.

Mechanization will boost production

The United States Agricultural Mission retained in the Philippines by the Philippine Government to investigate farm mechanization, has indicated that on small farms of less than 100 hectares, the use of mechanized equipment is neither practical nor economical. Considering that the majority of the privately owned farms are comprised of this acreage or even less, the general use of animals for tilling the soil may be expected to continue, especially in view of existing climatic conditions and the general nature of the terrain.

The manufacture of farm implements can be resolved into three separate categories:

Three separate categories

1. Implements, the motive power for which is to be provided by mechanical equipment.
2. Implements, the motive power for which is to be provided by animals.
3. Hand implements.

Of these three types, the manufacture of those implements for mechanical equipment use is definitely not recommended at the present time. The only exceptions to this are:

Canlubang Middle Breaker
A1-2 Share furrow
A2-3 Share and Plow

The lack of proper machinery and facilities, the shortage of raw materials, and the competitive nature of this operation are considered to be highly deterrent factors. It is felt, however, that study should be continued on implement design, the most adaptable methods of production, and the consideration of the type of raw materials to be used. At such time as circumstances dictate, the soundness of this prospect may again be considered, but it is felt that this will not be for several years to come.

Project may be considered at later date

Of the type of implements the motive power for which is to be provided by animals, and for hand tools, production appears entirely practical. However, this production should be confined to certain basic types as follows:

1. SINGLE ANIMAL IMPLEMENTS:
    - *a. MODEL BOARD PLOWS:*
        - (1) Styles
            - W—Wood beam
                - (a) W1-single handle
                - (b) W2-double handle
                - (c) W3-native plow
            - M—Metal beam
                - (d) M1-single handle
                - (e) M2-double handle
        - (2) Types
            - (a) Sod
                - a1-upland dry
                - a2-lowland wet
            - (b) Stubble
                - upland only
            - (c) General purpose
    - *b. HARROWS:*
        - (1) Peg tooth, upland and lowland, round peg and rectangular peg.
        - (2) Shovel tooth, upland.
        - (3) Shovel tooth, lowland.
    - *c. CULTIVATORS, SHOVEL TYPE*
    - *d. WEEDERS*
        - (1) Shovel type
        - (2) Rotary hoe
2. HAND TOOLS.
    - *a. HOES*
        - (1) Grub
        - (2) Garden
    - *b. RAKES*
    - *c. GARDEN TROWELS*
    - *d. WEEDERS*

Certain amount of alteration will be necessary

At the present time a government subsidiary, the Agricultural Machinery and Equipment Corporation, located in the National Development Company compound, Manila, is capable of producing agricultural implements of the type indicated above. However, a certain amount of rehabilitation, expansion, conversion and alteration will be necessary. The cost estimate for this program is as follows:

1.	Alteration to buildings	₱127,720
2.	Additional machinery and equipment, including installation	150,000
3.	Engineering and contingencies	91,100
	Total	₱368,820

Production schedule should be instituted immediately

A production schedule based on accurate market surveys should be instituted immediately upon the proper preparation of the plant. The production schedule upon which plant conversions have been recommended follows. However, this is subject to market requirements.

1. January, February, March	
a. Plows — Sod, lowland wet and general purpose	100 per day
b. Harrows — all types	50 per day
2. April, May, June	
a. Plows — Sod, stubble and general purpose	100 per day
b. Harrows — all types	50 per day
3. July, August, September	
a. Cultivators — Shovel type	10 per day
b. Weeders — Shovel type Rotary hoe	100 per day
4. October, November, December	
a. Middle breakers — both types	10 per day
b. Hand tools — all types	Based on market survey

It is estimated that an operating capital of ₱1,800,000 per year will be required for the above-mentioned production. The costs of market surveys and the expenses incidental to establishing sales agencies are included in this figure. The AMEC has been recently allocated ₱2,000,000 for the construction of a new plow factory within the National Development Company compound. This plant will produce casting and machinery parts and will also assemble animal drawn plows and other equipment.

Two implement plants are recommended

In order to adequately provide for the production of agricultural implements it is recommended that two implement plants be established, one in the Northern Islands of the Philippines, another in the Southern Islands. It is felt that the AMEC plant discussed above will adequately meet the requirements of the northern sphere. The second plant should be located in the Lanao area of Mindanao.

The estimated expenditures for this plant are as follows:

100 Has. land @ ₱100.00	₱ 10,000
Buildings	320,000
Buildings	200,000
Engineering contingencies	220,000
Total	₱750,000

Can Manufacturing

Very little need prior to the war

Prior to the war there was very little need for the can manufacturing industry. The ready availability of all kinds of containers from the United States in large quantity and at low cost accounted for the small amount of canning being done in the Islands.

There were three small plants known to be in operation prior to the war. Two of these were owned by the government and were purchased in connection with its pioneer cannery operations. The third plant, privately owned and operated, was semi-automatic and of unknown production capacity.

Of the two government plants, one is owned by the National Development Company. The capacity of this plant is a total of 250-300 cans per minute of the following sizes:

1. No. 1 E.O., 2-11/16" x 4"
2. No. 2, 3-7/16" x 4-9/16"
3. 7 oz. flat
4. 1/lb. flat.

Plant now idle

This plant is practically intact but because of the lack of demand for the size of the containers produced it is now idle. The plant includes an enameling unit capable of treating 2,000 tin plates per hour.

The other plant mentioned was owned by the National Food Products Corporation, a government enterprise. This plant was purchased as part of the equipment of a cannery which operated in Cebu prior to the war. The equipment included presses for 15 oz. oval, 120 gm. rectangular, 75 gm. rectangular and 4 oz. cans. A considerable portion of this equipment was destroyed during the war or looted after the liberation of the Philippines.

Fresh foodstuffs command very high prices

Tin plate should be available for can manufacture in the near future and replacement parts for cannery machinery may no doubt be secured. However, the advisability of producing cans at this time is questionable due to lack of demand. The reason for this is that fresh foodstuffs command such high prices that local canned products, based on the high acquisition costs, cannot profitably compete with imported canned goods. It is not recommended that can production be considered until present produce values have been reduced and stabilized.

Ferro-Alloys

World demand for ferro-alloys is great and prices are correspondingly high. The Republic possesses all the necessary raw materials for the manufacture of these. Although adequate surveys and evaluations have not been made, deposits of chromite and manganese ores are known to exist in many parts of the country. Preliminary tests and surveys indicate that sufficient amounts of metallurgical grade chromite are available to support adequately a small ferro-chrome industry.

P. I. possesses necessary raw materials

It is believed that an initial installation of a ferro-chrome industry may well be the fore-runner of a substantial Philippine ferro-alloy industry.

The proposed location for the ferro-chrome plant is the Maria Cristina Falls area in Lanao, Mindanao. The location has been selected because of the availability of economical hydro-electric energy and charcoal. This industry should be closely allied with the proposed steel industry in order that mutual advantages may result.

An initial annual plant capacity of 14,000 tons of ferro-chrome alloy is proposed. This capacity has been selected on the basis of initial capital requirement and economical cost of production.

The following financial investigation is submitted:

Estimated Required Capital	₱7,411,900
Estimated Annual Sales	5,040,000
Estimated Annual Cost	4,475,000
Estimated Annual Profit	₱ 565,000
Expected Normal Yield	7.6%

Copper Smelting and Refining

Another industry that is considered vital to the industrialization of the Philippines is the production of copper. The establishment of this industry is of the utmost necessity owing to the fact that the manufacture of copper alloys such as brass and bronze are dependent upon this basic metal. In 1940 the import of copper and copper manufactures was valued at ₱1,577,910, while that of brass and brass manufactures stood at ₱1,300,361.

Copper production considered vital

High grade copper ores are available as raw materials and large quantities of copper concentrates are produced as main products of the numerous Philippine gold mining operations. Local coal and limestone are available for use as fuel and flux, respectively.

Copper smelter proposed for Iligan area

It is proposed that a copper smelter and refining plant of 7,800—15,000 tons annual capacity be established in the Iligan area, Lanao, Mindanao, or in some area contiguous to an ample source of copper ore.

It is estimated that a capital investment of approximately ₱17,000,000 plus will be required for the installation of a plant. However, a leasehold of sufficient area and reserve will be necessary to satisfactorily amortize this investment over a period of years.

Will encourage small industry

If a lease arrangement can be worked out to support this operation satisfactorily there would be an additional advantage in having a local base smelter in that the by-product sulphurous gases may be utilized in the manufacture of sulphuric acid.

Copper Wire

A large demand for copper wire, especially of electrical specification, can be foreseen in view of the extensive rehabilitation and development program.

In view of the unsatisfied world demand for copper wire products it is felt that the reconstruction and the industrialization program will be greatly accelerated in the event that this product can be efficiently and economically produced in the Philippines.

Tremendous demand for copper wire

Inasmuch as copper is the principal raw material, however, the manufacture of copper wire should not be undertaken until the production of refined copper in the Philippines has been initiated.

The pre-war Philippine imports of copper wire are indicated as follows:

	1939	*1940*	*1946*
Wire (plain)	₱120,172	₱540,134	——
Wire (insulated)..	793,523	759,906	₱921,214

It is estimated that two plants having a combined yearly capacity of 10,000 tons will provide the required production necessary to sustain the proposed industrial program. The capital requirement necessary for these two proposed plants is estimated at approximately ₱4,140,000.

Manila and Lanao

Proposed sites for the above-mentioned plants are Manila, Luzon, and Lanao, Mindanao.

Non-Ferrous Foundries

More than ₱4,000,000 worth of non-ferrous metals and manufactured articles were imported by the Philippines in 1940. A large portion of this importation consisted of manufactured articles such as door knobs, locks, table wares, kitchen wares, electrical fixtures, decorative articles, and machine parts.

The Republic does not produce sufficient non-ferrous metals in the refined form to support an industry on a scale sufficient to meet domestic demands. Consequently, it will be necessary to utilize sizable quantities of scrap or imported metals.

Although the proportion of non-ferrous scrap of the available war scrap is unknown, it is felt that sufficient quantities exist to initiate this industry on a progressive basis.

Ultimately, it is estimated that local demands will require four plants of an annual capacity of 5,000 tons each. The total capital investment for these plants will be in the region of ₱4,600,000.

Construction and Conveying Equipment

In view of the comparatively low unit production demands in relation to the expenditures necessary for the purchase of specialized machinery and the necessity for the specialized training of personnel, the manufacture of the more complex items of construction and conveying equipment is not considered practical.

However, the manufacture of certain of the simpler types of construction and conveying equipment such as concrete mixers and gravity, chute, belt, slat and pallet conveyors is considered to be practical. Although complex parts such as motors, reducers, conveyor chains and belting must necessarily be imported, the equipment required for the fabrication of the above mentioned items will probably be included in any miscellaneous metal and machine shop. Few personnel will require extensive specialized training for this type of operation.

Few personnel will require training

Aluminum and Magnesium Industries

The establishment of plants for the production of metallic aluminum and magnesium should not be considered at this time. The domestic demand for these products is too small to justify the expenditures required for the necessary reduction plants and rolling mills. Although deposits of bauxite are believed to exist, there are no known extensive deposits suitable for immediate development.

Should not be considered

The aluminum and magnesium reduction plants expected to be made available to the Philippines as a portion of ad-interim reparations payments may be used in the mining and chemical industries until such time as the production of metallic aluminum and magnesium is undertaken.

Die Casting

Die casting is the process used for the mass production of items of the same size and shape. Its application is limited to non-ferrous metals, principally zinc and aluminum. Little of this type work is performed in the Philippines at the present time.

Development should be postponed

Inasmuch as the Philippines possesses no metal fabrication plants capable of absorbing the output of a die casting unit and has no steady and economical source of non-ferrous metals capable of sustaining the industry, the development of this industrial phase should be postponed until such time as industrialization has reached the mass production stage.

Aluminum Utensils

Last year the Philippines imported approximately 105 tons of aluminum wares, valued at ₱432,500. This demand was partly owing to war damages and the lack of imported supply during the years of Japanese occupation.

Higher standard of living

The increase in population, however, together with an anticipated general desire for a higher standard of living and the increased incomes to be expected as the result of a successful industrialization, will undoubtedly sustain a sizable yearly demand for some time to come.

Furthermore, the possibility of developing an Asiatic export market should not be overlooked.

Inasmuch as the local production of aluminum sheets and plates is not contemplated, raw materials for utensils manufacture must necessarily be made available in the form of aluminum blanks. The use of these blanks which are flat shapes stamped from strips, sheets or plates, will constitute considerable savings in material costs, freight expense and handling expense.

The establishment of a plant of 100,000 pieces per year capacity will require a capital investment of ₱200,000, not including plant buildings.

Subsidiary Metal Industries

The industries falling under this group are too numerous to be studied and reported individually. Among them are the following:

Electro galvanizing
Kitchen hardware

Steel sash
Lighting fixtures
Electric motor assembly
Electric conduits
Centrifugal casting
Copper and aluminum tubing
Hardware
Plumbing goods
Hand trucks and wheel barrows
Gasoline and oil lamps
Scientific and professional equipment

It is expected that with the establishment of the basic metal industries, these subsidiary industries will be initiated principally by private capital. A general estimate indicates that approximately ₱25,000,000 will be required to establish these subsidiary metal industries.

Will be initiated by private capital

CHEMICALS

IN THE DARK Ages alchemists sought the hidden formula of gold in the early dawn of Man's gropings on the outermost fringe of chemical knowledge. Today, modern chemical wizards have harnessed the chemical products of the earth in such a way as to vie with Nature itself. They have found a formula infinitely more valuable than that first humble longing to make gold.

In this 20th Century, chemical resources form the life stream of any industrial nation. All the world over, industrial chemicals are in the greatest demand.

The industrial and agricultural development of any country is dependent upon the availability of certain chemical products, provided in ample quantity and at low cost. The chemical industries, particularly the basic plants, must be established and developed in order that the success of the agricultural and industrial programs may be assured.

One of the most serious and common obstacles to the chemical industry is the absence of "know-how" and of engineers capable of assuming charge of producing plants. Millions of pesos are being invested in the chemical industry of all the industrialized countries in the world today.

Prime examples of the emergence of new countries in the industrial chemical field are the Latin American nations. In the South American continent many projects have proved unsuccessful when their own national engineers were charged with the construction and operation of the plants. In Mexico, for example, a large plant for producing organic acids was constructed and equipped several years ago. Through a lack of know-how it has never produced any of the chemical products for which it was designed. Similarly, a large alkali plant involving an investment of several million dollars was initiated by the Mexican Government. It proved unsuccessful until an American company became a partner with the Government and assumed the technical responsibility for its operation.

Philippines offers broad and varied field of opportunity

Industrial chemistry in the Philippines offers a broad and varied field of opportunity. With practically no chemical industry operating in the Republic at present and with expansion in both agricultural and industrial fields indicated in this report, the production at least of certain basic chemicals and chemical products should be undertaken.

Sulphuric acid will be required in the manufacture of fertilizers and explosives, and in the iron and steel industry. Salt and limestone are available from local sources. With low-cost power becoming available from hydro-electric development, particularly in the vicinity of the Maria Cristina Falls, it should be possible to produce caustic soda and soda ash for use in the proposed expansion of the Philippine paper, soap, glass, leather, rubber-products, petroleum, and vegetable-oil industries.

Tremendous electrical power potential of the Philippines

The pre-war import of fertilizers chiefly for the sugar industry called for annual expenditures in excess of $3,300,000. The requirements of the post-war sugar industry exceed the pre-war needs, while the proposed irrigation and agricultural expansion will increase requirements. With the tremendous electrical power potential of the Islands, particularly the Agusan River and the Maria Cristina Falls, and with numerous other possible hydro-electric sites it would appear to be both logical and profitable to produce nitrogenous fertilizer.

Other chemical products, for which the Philippines has all the requisite raw materials, are soaps, toilet preparations, dynamite, paints, pigments and varnishes.

Other fields offering opportunities for post-war industrial development may be found in the manufacture of insulating wallboard from sugar cane waste, fine paper from abaca waste or from cogon grass, and newsprint from wood pulp. The production of brick and hollow tile, glazed tile, and porcelain ware, refractory brick, flat glass, and glassware also invites attention, while raw materials are at hand for the manufacture of shoes and leather products.

Petrochemistry may have future here

Petrochemistry, a new term that is finding growing significance in industrial research, may have a future in the Philippines. Its value will consist in utilizing crude oil and natural gas as basic raw material in chemical processes for manufacturing synthetic resins and rubber as well as a variety of basic chemical substances.

It should not be overlooked that the refining of petroleum constitutes a big-volume business. Tank-car shipments represent small scale business. Capital investment and labor cost per barrel must be relative if petroleum derivatives are to be economically employed by industry. This is the formula which is being employed at present by United States production.

The production of chemicals in the Philippines will depend upon the availability of raw materials. Inasmuch as preliminary surveys indicate that ample raw materials are available to sustain the proposed chemical industries, or that the importation of the necessary raw materials is practical, it is felt that the establishment of the proposed chemical industries, in addition to being necessary and desirable, is economically practical.

The following industries are presented in two categories:

1. Chemical industries, the establishment of which is based on the possible receipt of machinery and equipment as the Republic's share of the Japanese ad-interim reparations payment.
2. Chemical industries, the establishment of which will require the purchase or acquisition of necessary machinery and equipment from other sources.

The financial investigation of each industry is based on this general premise.

Category I

SULPHURIC ACID—The manufacture of sulphuric acid is dependent upon the availability of sulphur or pyrites, both of which are to be found in the Philippines.

Sulphur is known to exist in P.I.

Sulphur is known to exist in deposits in Leyte, Davao, Surigao and Occidental Negros. It has also been reported that pyrite deposits exist in Palawan and are known to be available as tailings from gold and other mining operations.

Although known to be small, Philippine sulphur deposits are estimated to be as follows:

1. Camiguin Island, Cagayan Province—4,100 tons of commercial sulphur in sight. Analysis: S—81.6%; As—trace; Se—None; Occurrence; Solfataric (irregular both in extent and depth.)
2. Burawan, Leyte Province—3,000 tons. Occurrence; Solfataric.
3. Biliran Island, Leyte Province—400 tons. Occurrence: Solfataric.
4. Mount Silay, Occ. Negros—300 tons. Occurrence: Solfataric.
5. Mount Apo, at about 1,400 meters elevation—500 to 1,000 tons. Occurrence: Solfataric.
6. Baut Island, Davao Province—No estimate.
7. Tubuangan, Mt. Province—1,000 to 1,500 tons.

Can easily be adapted for the use of sulphur

Although it is understood that all Japanese sulphuric plants available as part of ad-interim reparations are designed to utilize pyrites for the production of sulphuric acid, these plants can be easily altered and adapted for the use of sulphur. Their type of operation, therefore, will be dependent upon the availability of the raw material. In this respect it is pointed out that whereas the use of imported sulphur is economically possible, the importation of pyrites for use will not insure economical operation nor should local pyrites be utilized unless a supply is known to exist capable of sustaining the industry for a period of 17 years. The final decision as to which raw material may best be utilized will be dependent upon the final survey findings.

Decision must depend on final survey

The 5 per cent ad-interim reparations allocated to the Philippines will provide a total sulphuric acid plant capacity of 41,000 metric tons. This capacity will enable maximum pre-war demands for commercial sulphuric acid to be met and will provide for additional production sufficient to sustain the proposed chemical fertilizer plant $[(NH^4)^2 SO_4]$. However, considering the fact that sulphuric acid is of such great importance to all industries, it has been requested that 11 per cent of available Japanese reparations equipment of this particular type be allocated to the Philippines. The receipt of this amount, approximately 90,000 metric tons of capacity, would enable pre-war demands to be met, would sustain and provide for the expansion of the proposed ammonium sulphate plant and would make available ample quantities of sulphuric acid to other industries.

The following financial investigation, based on the receipt as reparations of the 41,000 metric ton sulphuric acid plant and the initial use of imported sulphur as a raw material, is submitted:

Capital Investment Required	₱4,700,000
Annual Operating Cost	2,500,000
Gross Income	2,880,000
Net Profit	380,000
%annual return on Capital Investment	6.6%

It is estimated that normal operation will occur during the first quarter of the second year of actual operation. A sufficiently large reserve capital has been provided to amply cover the expected losses which will be incurred during the first year of operation.

CAUSTIC SODA—CHLORINE: Pre-war imports of caustic soda averaged 6,000 metric tons, valued at ₱620,000. In 1946, approximately 6,050 metric tons were imported, valued at ₱1,500,000. The discrepancy in these figures can be attributed to interim price increases.

The establishment of an electrolytic caustic soda plant is considered potentially sound in view of the availability of low cost power expected to be produced by the proposed hydro-electric development projects, and the domestic resource of the principal raw material in the form of salt. Considerable saline deposits are known

Establishment of caustic soda plant potentially sound to exist in Nueva Vizcaya, Ifugao, Batangas and Davao, and salt produced by solar evaporation is available in adequate quantity in many localities. The construction of the proposed modern salt production unit will more than adequately supply the needs of the caustic soda-chlorine industry.

The receipt of the Philippine share of the Japanese ad-interim reparations equipment will provide approximately 23,000 metric tons of caustic soda capacity. In addition, yearly production from a plant of this capacity is expected to produce approximately 18,300 metric tons of liquid chlorine and approximately 200,000,000 cubic feet of hydrogen.

Excess caustic soda will be absorbed in reasonable time

Although this proposed capacity appears to be considerably in excess of the domestic pre-war demands of the country, it is felt that the excess caustic soda produced will, within a reasonable period of time, be absorbed by the Asiatic export markets or by the expected expansion of such established industries as soap manufacture, oil processing plants and textile mills, and the expected establishment of new industries such as pulp and paper products manufacture, etc. The chlorine and hydrogen produced can be utilized as raw materials in the proposed hydrochloric acid plant and any excess can be placed on the commercial market or made available for export.

The financial investigation of the establishment and operation of the proposed plant of 23,000 metric tons capacity of caustic soda (76 per cent pure) is as follows:

Capital investment required	₱10,700,000
Annual operating cost	9,000,000
Gross Income (Caustic & Chlorine)	9,700,000
Net Profit	700,000
% Annual Return on Capital Investment	6.4%

Present demand will be five times more than pre-war total

SODA ASH—Based on the rehabilitation and expansion of pre-war industries and the proposed establishment of new industries, particularly those of glass manufacture and chinaware glazing, it is estimated that the demand for soda ash will approximate to five times the maximum pre-war demand.

Pre-war imports of soda ash averaged 1,300 metric tons, valued at approximately ₱85,000. As against this, the total import of soda ash in 1946 only came to 275 tons valued at ₱28,000. This large decrease is directly attributable to the fact that few pre-war industries were operating during 1946.

Limestone deposits are known to exist in sufficient quantities in the country to sustain the soda ash industry. Until a coking process for the production of coke from Philippine coal is developed, charcoal can be used as a substitute. Charcoal production, upon which other industries will depend, is expected to be increased by the establishment of modern plants.

Financial investigation reveals that approximately ₱1,800,000 will be required as capital investment, while annual operating costs will approximate to ₱750,000. Based on current soda ash costs, a return of 15 per cent on capital investment may be expected.

Extensive areas considered worthy of exploration

SYNTHETIC OIL—Although the Philippines has so far produced no mineral oil in commercial quantity, there are extensive areas throughout the Archipelago that are considered to be worthy of exploration as having oil bearing possibilities, as discussed in a later section under "Mining."

The following regions have been surveyed geologically for oil possibilities:

1. Bondoc Peninsula, the Cagayan Valley, and central and south-eastern Luzon.
2. The islands of Panay, Negros, Cebu, Bohol, Masbate, Ticao, Burias, Leyte and Samar, together with the coastal areas of Mindanao and the Sulu Archipelago.

The possible development of undiscovered resources cannot be used as a basis for predicting oil fuel availability. It is evident, therefore, that fuels must either be imported or the local synthesization of these fuels must be developed.

Synthetic fuels cannot as yet compete with natural fuels. Owing to the depletion of world oil reserves, however, and the possibility of developing competitive synthetic products, most nations are engaging in extensive research in the field of oil synthesization. The Philippines, not possessing good quality natural fuels, should evidence particular interest in this subject.

Synthetic rubber is becoming more important now

SYNTHETIC RUBBER—The production of synthetic rubber has approached a point today when it is more than holding its own against the natural product. The United States, in particular, is trending more and more toward the use of synthesized rubber as against natural rubber. As a consequence, the synthetic product is becoming increasing important and is now almost as desirable as the natural article.

The current United States price of synthetic rubber is in the region of 18.5 cents as compared to the price of crude rubber at 22.5 cents per pound.

A synthetic rubber plant could be built in the Philippines within six months at a cost comparable to that of developing a plantation, the products of which could not be expected for six years. Equal production could be expected from this synthetic rubber plant as from the natural plantation, with the added advantage of being in production six years ahead of the natural product.

Synthetic rubber plant could be built in 6 months

Taking these factors into consideration, any extensive expansion of rubber plantations would appear to be an extremely speculative venture.

The proposed establishment of additional rubber-products industries and the expansion of the present industries of this type indicates that synthetic rubber production may be entirely feasible and should be given further study.

The chief source of raw materials for the commercial manufacture of synthetic rubber is petroleum, although the possibility exists that coal, which is available locally, albeit of low quality, can be utilized.

Chief source of raw materials

No financial investigation of this particular project has been made, for obvious reasons.

Category II

HYDROCHLORIC ACID—With pre-war industries resuming operation and new industries being established, there will be a heavy demand for hydrochloric acid.

Pre-war annual demands for this acid averaged 1,000 metric tons valued at approximately ₱80,000. Post-war demands are expected to exceed these figures by more than double.

The establishment of the proposed salt production unit will enable the pot-and-muffle process of hydrochloric acid manufacture to be used. Also, by the utilization of by-products of the proposed caustic soda plant, the synthetic process of hydrochloric acid manufacture may be used. Based on the establishment of the aforementioned industries, the most efficient and economical method of operation will be adopted.

Pot-and-muffle process of manufacture

For the immediate future, due to the fact that ample raw materials in the form of salt are available, the manufacture of hydrochloric acid by the use of the pot-and-muffle process is recommended. Using this process, the establishment of a plant of 1,500 metric tons annual capacity will require an estimated capitalization of ₱350,000 and will provide a return of no less than 15 per cent on the capital investment.

NITRIC ACID—The demand for nitric acid has not been considerable. However, the establishment of the proposed chemical fertilizer and ammunition plants will initiate heavy demands for this heavy chemical.

Proposed fertilizer will initiate heavy demand

This nitric acid plant should be installed in connection with the chemical fertilizer plant in order that excess ammonia utilized in the former may be made full use of. In this manner, a marked economy in operating expenses may be assured.

It is proposed that a plant of an annual productive capacity of 20,000 metric tons of 61.4 per cent nitric acid be established. This plant production is expected to be sufficient to sustain both the proposed chemical fertilizer and ammunition industries.

Financial investigation indicates that a capital investment of approximately ₱8,000,000 will be required and that an annual return of 12 per cent may be expected.

The plant should reach maximum productive efficiency at the end of the first year of operation, dependent upon the training of suitable technicians and operating personnel.

Chemical Fertilizer (Ammonium Sulphate)

The Philippines is not an agriculturally self-sufficient nation. Although it is recognized that the lack of mechanization, topography, geography, population density variations, acute lack of adequate transportation facilities, etc., are the main deterrents to agricultural self-sufficiency, the fact that greater productivity may be assured by the widespread and judicious use of proper fertilizers merits mature consideration.

The Philippine Government has embarked upon an ambitious program of food production. The capable minds directing this program are fully cognizant of the importance of proper soil fertilization to the successful accomplishment of this program. In any program of agricultural rehabilitation or expansion, the use of fertilizer as a means of increasing production per unit area cannot be over-emphasized.

Importance of fertilization recognized

Prior to the war, the maximum import of fertilizer, by type, was that of ammonium sulphate, approximately 58,000 metric tons valued at ₱6,966,119. The total fertilizer import of all types for the year 1940 was approximately 84,000 metric tons.

For the production of sugar, rice and corn alone, the Philippines had approximately 2,930,000 hectares of land under cultivation prior to the war. The success of the agricultural program will provide for the cultivation of 3,340,000 hectares of land within the five year period ending in 1951. Estimates are that if only 10 to 40 per cent of the total area devoted to the cultivation of rice, corn and sugar cane were properly fertilized, the following quantities of fertilizers would be required:

Ammonium sulphate	59,470	to	174,000	metric tons
Double super-phosphate	22,440	to	88,670	" "
Sulphate of Potash	7,240	to	40,780	" "
Total	89,150	to	303,450	metric tons

Education program expected to increase use of fertilizer

The farm education program is expected to increase the use of fertilizer far in excess of the above estimates. It is obvious, therefore, that there exists, and will continue to develop, tremendous demands for chemical fertilizers.

Although it is proposed that the initial chemical fertilizer plant be installed for the production of ammonium sulphate, the possible manufacture or development of ammonium nitrate and phosphatic fertilizers must be considered.

Ammonium nitrate has been used extensively as a fertilizer in the United States and is reported to have the following advantages as compared to ammonium sulphate:

1. It has a higher nitrogen content.
2. It may be mixed with either lime or chalk phosphate rock to improve the nitrification of the soil, thus making the nitrogen readily available to plant life.

Operation economy may be expected

In the event an ammonium nitrate fertilizer plant is established, sufficient capacity should be provided to insure an excess of ammonium nitrate which may be used by the proposed ammunition plant. In this manner, marked operation economy may be expected.

Phosphatic fertilizer exists in the form of guano deposits on the islands of Palawan and Leyte. These have been examined and were found to be small.

The manufacture of super-phosphate fertilizer is dependent upon phosphatic rock deposits. Although the Philippine Bureau of Mines has conducted no survey for phosphate rock deposits and possesses no information regarding the existence of such, Mr. A. N. Gray, in his book "Phosphates and Super-Phosphates of the World," second printing, 1945, sets forth the following table:

PHILIPPINE PRODUCTION OF PHOSPHATE ROCK

Year	*No. of Tons*
1922	2050

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1923	3781
1924	6528
1925	7528
1926	7512
1927	705
1928	1354
1929	1491
1930	1491
1931	260
1932	830
1933	3097
1934	20406
1935	1309
1936	497
1937	750

36% P_2O

Production of phosphate rock since 1922

It is claimed by Mr. Gray, however, that production of phosphate rock has been confined to that necessary for local consumption. He states that according to the United States Bureau of Mines, production of phosphate rock has been continuous since 1922. Guano is also produced, but is excluded from the statistics.

The manufacture of ammonium sulphate is dependent upon the availability of "producer" gas, a mixture of carbon monoxide and hydrogen. The most economical process by which this gas can be produced is that of passing steam through a bed of coke or charcoal. Coal or charcoal, therefore, may be considered as the basic raw materials for the manufacture of ammonium sulphate.

Quotations have been requested from the United States on equipment and machinery for the production of "producer" gas by utilizing coke or charcoal. The final decision as to which type will be selected will be based on the following considerations:

1. **Whether or not coke can be produced locally from available coals.**
2. **The comparison of imported coke prices and the price of locally produced or imported charcoal.**
3. **The availability of charcoal in quantity in connection with the proposed iron and steel mills.**

Proposed plant

It is proposed that a plant of 55,000 metric tons annual capacity be initially installed. Estimates indicate that no less than ₱12,000,000 will be required for the establishment of this plant.

Salt

No effort to develop salt on commercial basis

Prior to the war, annual production of salt averaged 17,000 metric tons. Saline springs are known to exist in Nueva Vizcaya, Ifugao, Batangas and Davao, but no effort has been made to develop these springs on a commercial basis. Consequently, the production of salt has been almost solely confined to the solar evaporation method, an expensive and time consuming process.

The establishment of the chemical industries and the expansion of the canning industry may be expected to increase salt requirements to approximately five times pre-war production capacity. It is obvious, therefore, that an efficient salt production unit of suitable capacity must be established in order that the necessity for importing this commodity may be obviated.

Evaporation of sea water

The production of salt by the evaporation of sea water is considered to be entirely feasible.

A plant of 200 ton daily productive capacity is considered to be of sufficient size. The output of this plant, plus the output of the various private solar evaporation plants, is felt to be adequate to meet the aforementioned requirements.

Financial investigation of this enterprise indicates the capital requirement for the establishment of this plant to be approximately ₱1,800,000, excluding the cost of land and salt vats. The annual return that may be expected on this capital investment is estimated at approximately 14 per cent.

The production of salt may be carried on in conjunction with the operation of the proposed caustic soda and soda ash plants, thereby assuring these industries of considerably lower production costs.

Plastics

Simple chemical compounds

Plastics are, in the main, chemically compounded from organic materials and contain carbon as an essential ingredient. They are not comprised of carbon in the form of coke or graphite, however, but are in the form of some simple chemical compounds derived from coal, tar, petroleum, natural gas or plant life.

These compounds are synthesized into materials. They are the synthetic organic plastics from which a multitude of useful goods and articles have been prepared.

The United States production of resins (phenolics, unreas, vinyls, alkydes, etc) increased from 59 million pounds in 1939 to 784 million pounds in 1944. Of the total in 1944, alkydes comprised

31 per cent and phenolics 20 per cent. Uses for the resins were divided as follows during 1944:

Molding and Casting	15.3%
Protective Coating	37.2%
Laminating	7.2%
Adhesives	10.5%
Textiles, Paper and Leather Treatment	3.5%
Miscellaneous uses	26.3%

Origin in coal

The most extensively produced and widely used plastic materials have their origin in coal. The most important of these raw materials are the phenols and cresols which are made by cooking phenol and formaldehyde in steam-packeted vacuum kettles under extremely sensitive control of heat, pressure and time. Interesting experiments are being conducted in which abaca and phenolic resin are used as raw materials to produce a red plastic material of great promise.

Raw Materials:—Coal, sand, cellulose, lime, petroleum, water, air, nitrogen, waste vegetable products and animal by-products.

Material Manufacturing or Finished products: — Surfacing agents, cast materials, laminated products, impregnating other materials, adhesives and bonding agents, miscellaneous stock and extruded plastics and molding powers, granules, blanks and preforms,

Estimated Capital Requirement .... ₱2,000,000

In view of the availability of materials its believed that the establishment of this industry in the Philippines should be of interest. Recent developments using sugar and cotton waste as a source of synthetic materials also offer great possibilities.

Soap

Demand for soap soared 10 times prewar figures

As shown by statistics, the present demands for soap and toilet preparations have soared to nearly ten times that of the pre-war years. In 1946, soap imports were valued at approximately ₱14,000,000. Pre-war soap production averaged 18,000 metric tons yearly.

The number of pre-war producers in the soap industry were approximately 175. Principally these consisted of small units or household industries. At the present time the only source of oil for soap and toilet preparations is copra, while tallows and hard oils are generally imported. Increased livestock production should provide a source of tallow, and the cultivation of oil nuts would provide the necessary hard oils. It has been estimated that the future requirements for the country for soaps would approximately be 35,000 tons of toilet and laundry soaps, and considering the demand, additional facilities will be required. For the initial increase of soap production a plant with the yearly capacity of 3,600 tons is proposed. The cost of this installation would require an estimated capital investment of ₱500,000.

Soap plant with 3,600 ton capacity is recommended

In view of the present demand and current prices of laundry and toilet soaps plus other related products a plant of this size may be expected to provide a minimum annual return of 20 per cent.

It is recommended that a more thorough research be undertaken in connection with toilet soap manufacture and that all locally available raw materials be studied with a view towards their utilization.

Need for greater domestic output

With the present demand for toilet preparations there is need for increasing domestic production of toilet preparations using raw materials which can be produced in the country. Estimates have indicated that the value of annual production would exceed ₱9,000,000. The development and production of this commodity will require careful study as to packaging, selling and processing.

The capital requirements should be approximately ₱1,500,000 at the initial period and increasing as the market conditions warrant. This industry will contribute to the development of extraction and preparation plants such as alcohol, oils, powders and greases.

Must supply "eye-appeal"

In order that local products may be able to compete with imported soaps, it will be necessary that modern shapes, forms and essences be introduced. Wrapping and packing must be considered of utmost importance in supplying the "eye-appeal" so necessary for the marketing of any retail product.

Dynamite

There are no factories manufacturing industrial explosives in the Philippines, despite the fact that the Republic exports 1,500 tons of glycerine produced from coconut oil annually valued at ₱520,000, according to pre-war records. Imports of industrial explosives averaged 5,000 tons annually, valued at ₱2,900,000.

Explosives may be manufactured in Philippines

There are definite possibilities that industrial explosives may be manufactured locally. From the soap plants, and the coconut industry, a continuous supply of glycerine can be assured and the overall industrial plan calls for the establishment of chemical plants (H_2 SO_4, HNO_3 and soda ash), from whence other required raw materials may be occured.

With the rehabilitation of the mines and their expansion, the rebuilding of roads and railroads and the opening of new highways, the demand for industrial explosives will be great. It is estimated that sufficient demand will exist to justify the erection of a plant with a yearly capacity of 3,000 metric tons. Such a plant may require a capital investment of approximately ₱2,700,000. Based on the current price of commercial explosives, it is estimated that 10-12 per cent of the capital investment can be expected as an annual return.

Great demand for explosives seen

Paints, Varnishes, Pigment

Only one plant in the Philippines is engaged at present in the manufacture of paints, and most of the raw materials used in the process are being imported.

Only one plant operating now

Pre-war annual average importation of paints, varnishes and pigments averaged 5,500 tons, valued at ₱2,000,000. These figures were doubled in 1946, the total value being assessed at ₱4,000,000.

The Philippines possesses several sources of raw materials which need extensive development. Turpentine can be processed from Benguet pines; the cultivation of lumbang can be further developed and scientifically controlled. Mineral pigments (red and yellow ochre) are believed to exist in Ilocos Norte. The feasibility of the establishment and development of the industry in this country depends largely on the extensive study, survey, scientific culture and research of the possible raw materials.

Initially, it is recommended that a plant of a yearly capacity of 3,000 metric tons be established. A financial investigation of this proposed operation is as follows:

Capital Investment	₱3,500,000
Gross Income	1,150,000
Operating Cost	900,000
Percentage annual return on capital investment	9.2%

Species of Resins in the Philippines:

There are various resins produced in the Philippines.

1. Damar
2. East India Macasar (Hiroe)
3. East India Singapore (Rosak)
4. Elemi
5. Kauri
6. Loba
7. Manila
8. Pontianaki, etc.

The most abundant of these resins in the Philippines are the following:

1. Elemi
2. Loba
3. Manila

Manila Copal

These resins come from trees with a specie of Agathis Alba, except Elemi which comes from Canarium Communis. The Loba and Manila species are called the Manila Copal.

Supply of resins

Agathis Alba, Almaciga, or Manila Copalare is the same as Kauri (Agathis Australis from New Zealand). It is found growing in considerable numbers at altitudes of from 200 to 2000 meters, but in the Philippines it usually attains its best developments on well drained places or slopes at from 600 to 1,500 meters elevation. The tree is very common in the Philippines and exists in mountain slopes throughout the country. It has been reported from the following regions:

Cagayan, Isabela, Lepanto, Benguet, Abra, Zambales, Nueva Ecija, Bataan, Rizal, Tayabas, Mindoro, Camarines, Albay Sorsogon, Calayan Islands. Manila copal is a very similar specie to Agathis Australis of New Zealand.

According to the Bureau of Forestry manual, the forest products cut or gathered from registered private woodlands are 50,574 kilos for Manila copal and 163,944 kilos for Elemi wherein Surigao comes first in the production, Masbate second, and Nueva Ecija, third. In 1938, the resin utilized from all Philippines were as follows:

747,329 kilos for Manila copal and 11,072 kilos for Elemi.

Wide demand for Guttapercha

Guttapercha is now being grown successfully in a number of tropical countries but in the Philippines no extensive development of the industry can be expected until the trees are cultivated in plantations. Due to the wide demand for the product as medicinal and insulation ingredients, and with scientific methods of production the material can be commercially successful.

The Philippine species containing guttapercha are numerous but in most cases the grade is apparently too poor to make its collection profitable. The best known of Philippine guttapercha sources is the Palaquim Shernianum which usually grows to a height of approximately 125 feet and a diameter of 4 feet. Howsever, species are reported to occur not in stands but rather as scattered trees or in patches.

Mindanao is main center

The center of production has been mainly confined to the island of Mindanao. No active records are available as to the cost of tapping the gum which leads to the conclusion that an estimate of cost to establish a plantation is not desirable at this time until further surveys and studies are made.

Recommendations

1. The government should determine the species which yield the best grade of guttapercha.
2. Determine the feasibility of the species producing the best grade as plantation species and encouraging the people to go into the industry.
3. Should enact stricter rules on the species producing guttapercha and employ enough personnel to enforce these rules.
4. Study the best scientific methods of tapping and processing.

Pastes, Glues

The rehabilitation of the animal industry, the tanning industry, and the establishment of meat packing plants present great possibilities for the manufacture of pastes and glues. The pre-war annual import of these products averaged 150 tons, valued at ₱140,000. These figures were maintained in 1946, the import being 145 tons assessed at ₱151,000.

Two plants are recommended

It is recommended that two plants with a yearly capacity of 100 tons each be established in the immediate future. It is estimated that each of these plants will require a capital investment of around ₱300,000.

Furthermore, it is strongly advised that these plants be erected adjacent to and operated in connection with the slaughter house and meat packing plants in order that economy of operation may be effected.

Pharmaceuticals

Controlled by private capital

The small scale pharmaceutical industry of the Philippines is controlled by private capital. In spite of the fact that some of the raw materials are imported, the manufacture of pharmaceuticals appears to be successful. The Philippines has available an abundance of medical herbs, which makes this particular industry feasible. It is recommended that aid be extended to those engaged in the manufacture of pharmaceuticals in the form of research which the Government should pioneer and execute through its scientific institutions.

Emphasis should be placed on the cultivation of medicinal plants on a commercial basis. Undoubtedly Philippine flora contains the ingredients for an extraction industry which could possibly produce caffeine, digitalin, eucalyptal, quinine, senna and many other substances for the treatment of disease. An excellent source of vitamin A is shark liver oil, and a fish oil extraction plant is highly recommended to process this product. A shark oil mill can be easily built with local material with the exception of electrical equipment and centrifugal. The importation of raw materials and using domestic ingredients where possible, then packaging the products, would constitute a definite advantage. Containers such as bottles, capsules, caps, and ampules can be made locally.

Emphasis on cultivation of medicinal plants

Photographic Equipment and Supplies

It is not believed that the manufacture of photographic equipment and supplies should be considered for the Philippines. In 1940 only 85,913 pesos worth of cameras of all types were imported into the Islands. Inasmuch as there are numerous lines of photographic equipment available, it is not believed that the local demand would be sufficient to justify the manufacture of one line unless foreign distribution could be guaranteed. However, it is not felt that the Philippines could expect to compete with foreign products of this type. The investment in a camera plant is very large and high production would be essential in order to maintain low costs. The manufacture of lenses requires a highly complex technique and years of training, and the technicians necessary for this work are not available at the present time. The manufacture of simpler box cameras might be attempted, but only after a complete economic survey of the situation had been made.

Not recommended

Manufacture of simpler box cameras might be tried

The manufacture of film and photographic paper may be considered in the same category as cameras. The plant and machinery necessary for an industry of this type requires considerable capitalization and it is believed that the ability to sustain itself against foreign competition (even under protective tariff) is very questionable.

Starch

Pre-war production of vegetable starches was mainly by small mills. Actually, the supply of this commodity never exceeded demand, the shortage varying between 5,000 to 10,000 tons annually. The present cultivation of cassava, camote and other starch tubers should be intensified, thus providing additional agricultural revenue

Cassava, camote, starch tubers

besides desired crop rotation in upland rice and corn growing areas. Increased output to meet the market needs would entail a capital investment of approximately ₱1,400,000.

Miscellaneous Industries

With the establishment and development of the principal chemical industries, the manufacture of ink, crayons and oil paints may well be developed.

MINING AND QUARRYING

MINING WAS THE second major industry of the Philippines prior to the war, being second only to sugar. If the world had not been precipitated into the most destructive war in history, mining would undoubtedly have led the export trade by several million pesos, and, on this basis, would have become the major industry of the Republic.

Although large scale mining operations were of comparatively recent date in the Philippines, the production and export of gold and silver, iron ore, copper ore, and concentrate, and chrome and manganese ores had increased so rapidly just prior to the war that minerals were approaching first place among export products.

Exports of gold alone advanced from ₱31,979,030 in 1935 to ₱64,623,205 in 1938.

War damage to Philippine mines has been estimated at ₱121,000,000. High construction costs and the scarcity of equipment have retarded rehabilitation, but as these conditions ease, mining activity is expected to increase rapidly.

Manila Stock Exchange gives good pointer

The Manila Stock Exchange provides an excellent pointer to this effect. Notwithstanding the unpromising outlook for the Philippine mining industry—activity in which was virtually at a complete standstill—the Exchange opened with a boom in mining shares in January 1946. Active demand appeared to be due to:

1. The large amount of money seeking investment,
2. The fact that very high prices had been offered in the United States for Philippine mining shares, and
3. Reports that gold was selling in various world markets at exhorbitant prices.

During the first 10 months of 1941, the Philippines exported gold and base metals valued at ₱78,502,164. Considering this a relatively constant rate, a yearly export market trade of ₱100,000,000 may be considered as having been reached. During the year 1946, due to war damages incurred, the industry was able to produce gold, silver and chrome valued at only ₱969,941.

The value of mining production for the years 1938 to 1940, by product, is indicated as follows:

	1938	*1939*	*1940*
Gold	₱64,623,205	₱ 74,131,216	₱ 78,308,289
Silver	1,487,155	1,818,626	1,999,125
Iron	4,080,645	4,914,800	5,564,992

Copper concentrates & ore combined .	**1,672,755	*2,962,484	4,636,649
Manganese	1,098,770	602,623	1,420,389
Chromite	1,576,845	2,295,167	2,938,616

In 1940, there existed in the Philippines 43 gold mines, 16 manganese mines (of which five were producing), five chromite mines, and four copper mines. The estimated capital invested in all mining interests was ₱156,400,000 or an increase of ₱85,600,000 over that of the year 1938. The estimated investment in the year 1938 was ₱70,600,000, of which ₱44,000,000 represented buildings and equipment, and ₱26,200,000 represented inventories and cash.

In 1940, the mining industry provided employment for approximately 43,000 workers and paid to these workers, in the form of salaries and wages, approximately ₱22,000,000. Taxes in the amount of ₱7,447,615 were paid to the national treasury. This amount comprised approximately one-sixth of the total amount of taxes collected by the national treasury from all industries and enterprises for the same year.

It is estimated that the replacement of equipment, machinery and facilities, based on current market prices will require an actual expenditure of approximately four times the amount of assessed damages, or ₱484,000,000. Although some mining companies have resumed operations and others are awaiting the arrival of replacement machinery and equipment, it is quite evident that financial aid in the form of loans or prompt payment of war damages will be necessary in order that rehabilitation may be accelerated. Unaided, the industry may not achieve pre-war production rates for some years.

Mining industry must be given full assistance

At the present time the Philippines needs every benefit that may be derived from the proper utilization of natural resources. The mining industry must be given every possible assistance.

Coal is found in practically all of the larger islands of the archipelago. However, it occurs in commercial quantities only in the following districts:

1. **Polillo Island** 1,500,000 metric tons
Moisture — 3.52%
Volatile matter — 40.69%
Fixed carbon — 51.55%

** Ore only..... 524,458 tons
* Ore and concentrate

Ash — 4 %
BTU — 12,000 — 13,000
Characterized as bituminous semi-coking

2. Liguan Coal Mines
Batan Island

1,000,000 metric tons
Moisture — 4.37%
Volatile matter — 39.39%
Fixed carbon — 45.49%
Ash — 5.09%
BTU — 11,500

Characterized as bituminous non-coking

Remarks — These deposits were investigated by the U. S. Corps of Engineers and were found to be the most satisfactory of coal deposits in the Philippines as to quantity, and of superior quality to the greater part of the coal imported from Japan. According to the company records this appeared to be one of the largest operating coal mines in the Philippines. Borings by diamond drill showed the seams to be continuous to a depth of 200 ft. below sea level. It was also determined by this company in the Liguan spur of the main Urgera Ridge where the old military workings started on the beach. According to the company, the seams worked in that area are as follows:

Military	Mine No. 4	in Seam		3 and 4
"	Old No. 5	"	"	3 and 4
"	New No. 5	"	"	5
"	San Francisco	"	"	3
"	Big Tree	"	"	4
"	No. 9	"	"	3

As the output is made up of two seams, of a slight difference in calorific value, and of a greater portion of Seam 5 than of Seam 4, the following analysis by the Bureau of Science for 20 deliveries made to the Government totalling 10,000 tons during one year may be taken as a fair

	average: Moisture . . . . 6.24 Volatile Combustible matter . . . 42.19 Fixed Carbon . . . . 46.37 Ash . . . . 4.85 Sulphur . . . . 0.35 Calories 6,700 BTU 12,072 Production of the mines for the four years preceding the war averaged 37,000 tons per year, as follows: Production 1938 — 48,000 tons 1939 — 40,892 " 1940 — 29,503 " 1941 — 32,116 "
3. **Sibuguey, Malangas**	1,800,000 metric tons Moisture — 2.05% Volatile matter — 12.95% Fixed Carbon — 12.95% Ash — 4-9.4% BTU — 12,500 — 14,000 Characterized as semi-anthracite, semi-coking. Fuel value equipment to that of North Borneo and Japanese coals.
4. **Uling, Cebu**	300,000 metric tons Moisture — 14.9% Volatile matter — 38.63% Fixed Carbon — 41.91% Ash — 4.56% BTU — 8,000 Characterized as sub-bituminous, non-coking. Remarks—Production 100 T/day. Production for small workings (native) 50 tons per day as of June, 1941.
5. **Cahumahumayan, Cebu**	1,000,000 metric tons Moisture — 12.40% Volatile matter — 41.63% Fixed carbon — 42.41% Ash — 3.4% BTU — 10,370

	Characterized as sub-bituminous, non-coking.
	Remarks — No production; only underground development.
6. **Cataringan, Masbate**	200,000 metric tons
7. **Sugod Bay, Sorsogon**	1,500 metric tons
8. **Bualacao, Mindoro**	800,000 metric tons
9. **Semirara Island**	2,000,000 metric tons

As has been pointed out, the coal bearing formations in the islands are of Tertiary age and for the most part belong to the Miocene period. The coal basins are comparatively small and discontinuous and of irregular outline. This is to be expected because of the peninsula and archipelagic conditions which existed during the coal forming period. The seams are generally faulted, folded and sometimes intruded by igneous intrusions.

Formations are of Tertiary age

It should be noted that Philippine coals are non-coking. Tests are currently being made in the United States, however, with a view to determining whether they may be converted to coke. The type of plant required would be approximately about ₱3,000,000. The returns on this industry will be subject to further study if found practical.

Tests now being made in America

Coal Gasification

Coal-seam gasification was suggested by Sir William Ramsay of England in 1912. Subsequently, in 1930, the Russians also performed considerable experiments on coal gas. The indications are that they have five different collieries in which there are gas mines.

Experiments made by Russians

Coal gas is now produced by charring coal into coke in a closed retort. This usually produces a 300 British Thermal unit gas. Coal gas in this form, is known as "water gas", of which the Manila Gas Company had one unit for the production of this type of coke. When it is enriched by petroleum spray, the BTU content of the gas is raised to about 500, which is known as city or cooking gas.

Today in the United States, all gas produced from coal represents a total consumption of around 20,000,000 tons of coal but the enormous possibilities of water gas reaction was not followed up until recently. This failure to develop a product and a market can be compared with the business now being done in natural gas, which centers in the Texas gas fields, this gas being piped to the industrial Middle West and the East as far as Philadelphia through the "Big Inch Line". The equivalent use in tons of coal as compared to the consumption of natural gas would amount to 150,000,000 tons. An

"Big Inch Line" in America

interesting sidelight on the coal reserves of the United States is that it has always been considered that a reserve of 3000 years exists.

Experiment by Alabama Power Company

The Germans developed a process whereby coke, low-grade coal, peat, etc., could be converted into gasoline, fuel oils and other petroleum substances. These were the synthetic products with which Germany sustained her military machine throughout the last year of the war. In early 1947, the Alabama Power Company experimented with a 30-inch drill hole into a carefully prepared coal seam and set it afire by using thermite bombs. The latest reports are that this experiment appeared to be successful and if so, the removal of solid coal from earth, for fuel-enery purposes, will be circumvented.

Company organized in America

A company in the United States has been organized for the purpose of designing conversion plants to synthesize coal gas into gasoline. For the conversion process, coal can be high-grade or low-grade and does not require any cleaning or grading.

Possible reserve in P. I.

In the Philippines, the extent of the sub-bituminous reserves is not accurately known although recent estimates have indicated a possible 45,000,000 ton reserve of sub-bituminous coals. Usually the thinness of the seams occurring with a heavy over-burden makes mining costs high in comparison with the practice adopted in the United States. There is also some faulting of the seams due to the intrusion of rocks and faults in the geological structure of the country.

Mining costs in P. I.

Mining costs in the Philippines range from approximately ₱6 to ₱10, dependent upon location. This, of course, does not take into consideration transportation etc. to the points of usage. This cost at the mine compares with an estimated cost of ₱6 per ton to provide adequate deep wells for the gasification of the coal. This latter estimate is expected to be much lower when the process has been fully developed.

Principle of underground gasification

It appears as if the Philippines could well study the possibility of utilizing the extensive coal reserves for gasification, thus producing synthetic gasoline and other oils which would essentially improve the chances for large scale industrial, chemical and other plants using fuels and oils. The principle of controlled underground gasification is the mass production of a 500 BTU gas effluent from the mines to begin with, with the added condition that no coal is handled. This latter is especially the crux of the development now taking place in the United States, Britain and Russia in order to conserve vital mineral oil deposits.

Possibilities of oil investigated

The possibility of oil bearing areas in the Philippines have been investigated by Grant W. Corby, petroleum geologist. The petroleum survey was sponsored by the Government at the request of the late President Manuel L. Quezon, through its agency, the National Development Company.

The following regions have been surveyed geologically for oil possibilities:

1. Bondoc Peninsula, the Cagayan Valley, and central and south-eastern Luzon.
2. The islands of Panay, Negros, Cebu, Bohol, Masbate, Ticao, Burias, Leyte and Samar, together with the coastal areas of Mindanao and the Sulu Archipelago.

The following facts have been taken from the report, comprising eight volumes, entitled "The Geology and Oil Possibilities of the Philippines", which was submitted in April, 1941, by Corby.

Panay Island

No seeps found on Panay

Despite the fact that no oil seeps were found on Panay, the stratigraphic sections of the island deserve comment. Along the Tarao River the sediments below the base of the Singit sand contain many small seams of lignite. The Tumbugan beds have carbonaceous material scattered throughout the entire series. In fact, the complete section offers a possible source rock for oil. The sand members, especially the Singit formation, contain abundant porous sand for reservoir rocks. The typical coal measures found elsewhere in the Philippines are absent.

No anticlinal structure of importance was found.

To prospect for oil on the structures in the west margin of the Iloilo Basin would involve drilling several test wells before the stratigraphic traps, if any exist, would be found. To obtain further subsurface information, it will be necessary to make a geophysical study of the area through the use of a seismograph.

Cebu Island

Oil seeps known in Cebu for many years

Oil seeps have been known on Cebu for many years. Oil was was first noted by the Spaniards in 1888. In the year 1890, shales which yielded small quantities of petroleum had been noted. Other seeps reported by residents were investigated near Barili, Dumanhog, Malabuyoc, and Sambaan.

Two other seeps proved to contain oil. One of these is immediately north of Guadalupe School, three kilometers east of Alegria. The oil comes from the Malubog formation near the Malubog-Cebu

Light gravity petroleum

Orbitoid limestone contact. According to local residents, this hole. if emptied, refills itself in a few hours. The oil, a light gravity petroleum, is green in color and is readily combustible.

The other seep is near Barrio Capisong. The odor from the seep strongly resembles that of gasoline.

1. Alegria anticline has oil possibilities; to test it properly might involve drilling several wells.
2. The Barili anticline, although long and narrow, is known to be favorable from fairly complete subsurface information.
3. The Daanbatayan anticline, which is most favorable because of its large size, is now being drilled by the Far East Oil Development Company.

Northwestern Peninsula of Leyte

The existence of petroleum in Leyte became known about 1890.

Oil possibilities in Leyte island

The general mapping of the extreme northwest end of Leyte shows that a stratigraphic section of considerable thickness is present. The Balite, San Isidro, and the Columbian dome probably present the best possibilities for petroleum accumulation since it is a closed structure involving a thick comformable section. In addition to these, the Calubian anticlines also have possibilities.

The Bondoc Peninsula

Petroleum seeps were encountered at Banco, Bahay, and on Milipilijuan Creek along the Maglihi anticline; on the Sili creek, a branch of Pagsanjan River, at Bacan on the central anticlines; on Malipa and Tangob creeks in the vicinity of Cabongahan; at Bato, north of Cabongahan; and near the Ajus River in the northeastern part of the field. Traces of oil and inflamable gas were detected at several other places, including outcrops of Vigo shale.

The Richmond Petroleum Company, a subsidiary of the Standard Oil Company of California, drilled four wells on the western portion of Bondoc peninsula, all four of which showed indications. The Far East Oil Development Company drilled five wells along the axis of the Molave-Maglihi anticlines. These wells also showed oil, according to reports.

Central Luzon Plain

Three anticlinal structures are known in Luzon

The three anticlinal structures known in the central Luzon Basin are: The Tarlac anticline; the Camiling anticline; and the anticline observed east of Pozorrubio, Pangasinan.

The most important of these is the Tarlac anticline. Lignite is present in the Tarlac formation and despite the absence of oil indications, the Tertiary sand and sandy shales underlying the Central Luzon Plains are possible oil horizons.

It remains to be seen whether or not this anticline is a true structural trap.

Cagayan Valley

In the Tuguegarao constricted area, three anticlines, (the Barung, Cabalwan, and Faire) have adequate structural relief and possess a minimum of 2,000 meters of section under them, part of which may be petroliferous. These three anticlines have prospective value.

Prospective value

The Aparri Basin is also important, inasmuch as it contains marine beds, and some anticlinal structures.

Far East Oil Development Company

The third report of the Far East Oil Development Company on the well-drilling and oil testing operations at Daanbantayan, Cebu, was issued on October 27, 1947.

The report reveals that the drill reached a depth of 9,950 feet on September 7, 1947, in the record time of three and a half months actual drilling. This is the deepest well ever struck in the Philippines. The report gives credit to the American drilling crew, which was assisted by Filipino labor.

Deepest oil well ever struck in Philippines

The first oil tests are reported, but complete tests may extend over a considerable period of time. Until a full production test is completed, no evaluation of the commercial possibility can be arrived at.

The report states: "It is therefore necessary that testing operations proceed most carefully; this should be done in stages."

In these tests, great care was taken to prevent any water from entering the well. The oil zone — 2,300 feet thick at intervals —is being subdivided for the tests. The upper zones will be the first to be tested.

A report of Grant W. Corby, Consulting Geologist, which speaks of the end of drilling at 9,950 feet, top of the basement rock, and of the first stages of testing, is quoted in the report as follows:

Oil report by Grant W. Corby

"A total of 2,380 feet of 7-inch casing was landed at 9,950 feet with the bottom interval of 498 feet perforated. The perforations were opposite the lowest oil and gas zones which had been found between the depths of 9,454 and 9,934 feet.

"The Johnston formation tester was set at 7,620 feet. Pressure between 9,454 feet and 9,934 feet was found to be 900 pounds.

"The second stage of the testing operations was to gun-perforate (firing the tester) the 7-inch casing opposite the various oil zones between 8,915 and 9,000 feet to test for water. Difficulties over rubber used for swabbing pipes developed.

"The third stage of testing began on October 5. The oil zones between 7,650 and 7,850 feet were perforated.

"The present operations to date give no evidence of water entering the well. Thus far, some oil and considerable gas are beginning to show.

The results of the test show: (1). The bottom hole pressure in the oil zones between 7,650 and 7,850 feet is 900 pounds; (2). The bottom hole pressure in the oil zones between 8,025 and 8,570 feet is 2,300 pounds; and (3). The bottom hole pressure in the oil zones between 9,454 and 9,934 feet is 900 pounds."

It is hoped that the final tests may uncover what may eventually prove to change the economy of the Philippines.

Results of Test

It is believed that there may be sensational developments forthcoming from these operations within the course of the next month.

Manganese

Manganese in the Philippines is known to occur in Siquijor, Busuanga, Panay, Leyte, Bohol and Masbate Islands, and to a lesser extent in Ilocos Norte, Northern Vizcaya and Camarines Sur on Luzon.

Manganese in all these regions occurs in the form of Pyrolusite (MnO_2) and Psilomelane (MnO_2H_2O) and, in general, of detrital or residual mode of deposition.

The deposits in Busuanga Island have been found to be of high grade. There were 10 Manganese mines before the war with an aggregate production amounting to ₱1,420,389 in 1940 as against ₱1,098,770 in 1938. Not all these mines, however, were producing. The majority of them were engaged only in exploratory work.

Production in manganese is recommended

It is strongly recommended that production in manganese be increased, partly for export and partly for local consumption. It is believed that manganese reserves are adequate for some years to come. The reserves are moderate at present but there are excellent possibilities of them developing into somthing considerably larger.

Approximately 90,000 tons of high-grade manganese were shipped to the United States during 1941. This was produced mostly in Siquijor, Busuanga, Masbate and Luzon.

Chromite

Chromite ore deposits have been found in several places in Zambales, Hagonoy, Camarines Sur, and in the western Cordillera of Panay near Valderama, Antique. It is also found in Misamis Oriental in Mindanao and Dinagit Island to the north-east of Mindanao. Traces of it have also been found in Ambil Island, southwest of Manila Bay, and in Lubang, in the group of islands northwest of Mindoro.

Contained nickel and platinum

One of the lenses in a Zambales chromite mine was found to contain nickel and platinum. This discovery was made shortly before the war and work on the vein has been insufficient to determine the value or extent of the deposit.

There were nine companies operating on chromite deposits before the war. Their total estimated ore reserves as of 1940 were 9,485,361 tons of refractory grade ore. Chromite production totalled ₱2,938,616 in 1940 as against ₱1,576,845 in 1938. Production amounted to ₱928,000 in 1946 and for the first six months of 1947 it amounted to ₱1,729,000.

Postwar production of Consolidated Mines Inc.

The post-war chromite production of Consolidated Mines Inc., in Masinloc, Zambales, has been given as the following:

1946 — 58,000 tons valued at ₱928,000
1947 (first nine months) — 138,306 tons valued at ₱2,346,821

The chromite ore from this large deposit located at Masinloc contains, in addition to chromic oxide, some 29 per cent of alumina and 11 per cent magnesium. The war interrupted research work looking to the separation of these minerals from the ore which, if successful, would increase the value of this deposit tremendously.

Analysis of chrome marketed in America

The following is an approximate analysis of some of the chrome ores marketed in the United States:

Cr_20_3	53.4%
$Fe0$	18.0%
$Si0_2$	1.5%
Al_20_3	12.2%
$Mg0$	13.6%
$Ca0$	0.1%
	98.8%

It is highly recommended that the extent of chrome mining operations in the Philippines be expanded in order to compete with other world producers.

Copper

The copper-bearing districts of the Republic are the Lepanto mine at Mancayan Suyoc district, Benguet sub-province, Pangasinan, Batangas on the island of Luzon, Maranduque, and Masbate as well as Antique on Panay Island.

The probable sources of copper ores and concentrates are as follows:

Probable sources of copper ores

1.	Baguio District	50 tons concentrate/day
2.	Paracale District	50 tons concentrate/day
3.	Rapu-Rapu, Albay	50 tons ore/day
4.	Mindanao-Surigao	10 tons concentrate/day
5.	Mindanao-Iligan	10 tons ore/day
6.	Cebu and Negros	10 tons ore/day
7.	Panay	20 tons ore/day
8.	Batangas	10 tons ore/day
9.	Zambales	15 tons ore and concentrate per day.

In the Philippines, copper is produced as a by-product in the recovery of gold and silver. The concentrate, which entails high shipping costs, is exported because of the absence of a custom smelter in the country. It is believed that the erection of a central custom smelter in the Islands would remedy this situation and would give tremendous impetus to mining. It would be more economical for private mining companies to send their by-products to this smelter than to export to foreign countries.

Prior to the war, there were three copper mines in actual production. In 1940 production amounted to ₱4,636,649 for ore and concentrate. In 1938 production amounted to ₱1,672,755 for ore and concentrate.

Asphalt and Bitumens

Natural asphalt and bitumens are found in the extreme northwestern peninsula portion of Leyte in the vicinity of the town of Vallaba. The deposit has been variously estimated to contain between 2,000,000 and 10,000,000 metric tons.

Impregnations of sandstones

The asphaltic material occurs as impregnations of sandstones, limestones, and clay tuff and appears to be residue of petroleum. after its lighter constituents had volatilized. It occurs also in distinct fissure veins and clay tuffs.

Asphalt should be investigated with regard to using the local product on streets and highways, in order to preserve dollar credits which are being spent at present on buying from the foreign market.

It is interesting to note that tests have been made on Taft Avenue in the city of Manila. Leyte asphalt was laid down on one side of the road, with foreign produce being used on the other side and it was noted that the local product stood up the better of the two. This encouraging comparison should in itself be enough to stimulate the local industry.

Tests made on Taft Avenue

Marble

The quarrying of marble is an important facet in the rehabilitation program. During the period of reconstruction, the local demand for marble is expected to be considerable and it is estimated that it will exceed pre-war demands by at least four times.

Important facet in rehabilitation

Prior to the war, the Philippines imported marble from abroad, principally from Italy. In 1939 the total import was valued at approximately ₱30,000.

It is felt that the development of this industry will not only enable this product to be made available for domestic consumption but may open a possible export field.

Marble deposits are known to exist in the Philippines. The most well known of these is the Romblon deposit, from which may be secured marble of comparable quality to that of the world famous deposit located at Carrara, Italy. The Romblon marble possesses the white or pale-white color most popular and is capable of taking a high polish whereby transluscence is emphasized and the sub-surface texture, color and marking are brought out without artificial treatment.

Marble deposits in Romblon are well known

The Romblon deposit is extensive and the unit cost of extraction (quarrying) is considered extremely advantageous due to the mode of occurence. Although pre-war production costs were low, even though quarrying was done by the use of blasting powder, picks and shovels, steel bars, etc., it is known that production costs may be further lowered by the proper use of more modern equipment. There is no doubt whatsoever that Romblon marble possesses competitive possibilities.

Romblon marble possesses competitive possibilities

It is estimated that a capitalization of ₱600,000 would be required for the development of the Romblon quarries. An estimated annual return of 10 per cent may be expected on this capital investment.

It is understood that the Teresa Quarries, located in Antipolo, are to be reopened shortly under private management.

Adobe Stone (Volcanic Tuff)

Adobe stone, or volcanic breccia as it is more properly termed, *Considerable success*

is widely used for minor construction work of all kind. The adobe stone quarrying industry has enjoyed considerable success, particularly during the present reconstruction period. Although the harder varieties of volcanic tuff, or adobe stone, as it is commonly known, are used in light construction, their use in construction work wherein compressive thrust and pressure are encountered is not desirable. Experiments show that it possesses crushing strength of 400 to 1,200 lbs/sq. in. In can be used in the building of from one to two stories. The softer varieties are widely used particularly because of relatively lower costs, for fencing and other stone work wherein little, if any, strain is encountered.

Volcanic tuff deposit areas

Volcanic tuff deposits are extensive and are found in the following principal areas: Meycauayan, Bulacan; Mariquina and Balintawak, Rizal; Cavite and Quezon. These deposits vary considerably in area and depth and the volcanic tuff found therein varies considerably as to texture, color, density and chemical composition. Fine grained and soft varieties are generally found in Quezon and Cavite, while coarse grained and hard varieties are found in Meycauayan, Bulacan.

Quarrying presents no particular problem. However, the problem of producing stones in sufficient quantity, of standard sizes and at low cost, must be considered. The production of the material by the use of pick and shovels and the sizing and trimming of blocks by the use of bolos and saws is considered extremely inefficient.

Production can be increased by at least 5 times

It is felt that production can be increased at least five times by the use of proper electric powered cutting tools. The amount of capital required will be dependent upon the proposed scale of operation.

Cement

Raw materials necessary for the production of cement are available in abundant quantities in the Philippines. Lime, gypsum, clay or shale are to be found on several of the islands. There are numerous deposits of great commercial possibility in various localities, particularly on the islands of Luzon and Cebu. The choice of site, however, is a matter of economics.

The acute housing shortage in Manila and other urban centers, the Government plan of constructing additional concrete highways, and the many other industrial projects demand an unprecidented proportion of increase in local cement production.

Present Status of the Industry

The Cebu Portland Cement plant is the only factory in actual production and has an annual capacity of 1,000,000 barrels. A proposed plan exists whereby production will be increased by an additional 1,000,000 barrels by the establishment of another new plant. This expansion is expected within the next 18 months. The Rizal Cement Factory is still idle with no indication as to when it will resume production.

Only one factory in operation

Expansion Project

A new plant equipped with the most modern facilities is recommended after present production is fully utilized. It should have an output rating of 1,000,000 barrels per year. The following financial investigation is submitted:

Modern plant recommended

Capital requirement based on annual capacity including fixed and working capital at ₱8.46 per barrel	₱8,460,000
Estimated cost of production at ₱3.70/bbl.	3,700,000
Estimated Gross Sales based on 1 million barrels at ₱4.80	4,800,000
Total estimated net profit per year allowing a total of 5% for sales tax and marketing cost	860,000
Percentage net return per year	23%

Discussion

There are many other minor cement consuming industries which will develop as construction increases. They are as follows:

1. Asphaltic concrete paving plants.
2. Concrete batching plant and mixers.
3. Concrete pipe manufacture.

These plants will be principally designed for the manufacture of road construction, transit mixed concrete and underground service system materials.

The most important project is the establishment of an additional concrete pipe manufacturing plant, if required, designed to produce two types of concrete pipe. These types are the vertically spun and cast pre-stressed, in sizes up to 36" in diameter.

Concrete pipe manufacturing recommended

In many communities in the United States concrete pipe is replacing cast iron for water and sewage purpose. This is a direct result of the extreme shortage in the production of cast iron pipe. However, it has been proven that concrete pipes serve the purpose satisfactorily.

There is one concrete pipe producing plant in the Philippines.

But owing to the shortage of re-enforcing wire required for the manufacture of the product, the resumption of normal operations has been considerably delayed. It is expected that this plant will resume full operation shortly.

Cement Block Industry

Cement building blocks were first introduced to the Philippines at a time of peak demand for building materials. The fact that cement building blocks, unlike adobe stones, are light in weight per unit and may easily be used for reinforced walls owing to their hollow formation, has enhanced their popularity.

Until recently, there were eight cement manufacturing plants supplying these products to the local market and several other companies which were awaiting the arrival of block manufacturing equipment from the United States.

Meeting increased sales resistance

Unfortunately, present manufacturers are meeting increased sales resistance, probably owing to recent decrease in lumber prices.

Manufacturers with inefficiently operated plants, who insist on selling at non-competitive prices and whose outlets are inadequate, may shortly face forced retirement.

Profits of middlemen eliminated

Although it is recognized that large capacity plants may produce at lower unit cost, the current trend in the United States appears to be the purchase of small simple portable plants by individual contractors. In this manner not only are the profits realized by middlemen eliminated, but the individual contractor is able to produce, on the project site, the materials needed in the required quantity. Considering that a complete portable machine capable of producing 1000 blocks per day using four semi-skilled employees now sells for approximately ₱1,000 F. O. B. United States, this approach appears reasonable.

It is not felt that entry into this field is advisable at the present time. The stabilization of the building material market will no doubt be evidenced shortly and this proposition may be more reasonably analyzed at that time.

Asbestos - Cement Wallboard

Present need increased

The present need for asbestos-cement wallboard has been decidedly increased by the extensive building expansion program and the limited shipment of this item coming from abroad. The current demand, however, is being adequately met by the Hume Pipe and Asbestos Company in Mandaluyong.

The factory has a total of 250 hired men and its present capacity working three shifts is 1,000 sheets a day, using 500 bags of cement.

This factory could double production at very little extra cost with the installation of another mud-pick-up roller.

Production being retarded by high prices of cement

Present production is being retarded by the high price of cement, which comes to ₱3.70 per bag at a composition of 88 per cent cement and 12 per cent asbestos.

The raw materials necessary for the manufacture of this product are readily available. There are asbestos deposits in Zambales and Ilocos Norte. However, there is considerable talc content in the local asbestos that prohibits its use in the manufacture of corrugated products. The quality of asbestos best suited for this latter manufacture can be imported from Ontario, Canada, at a fairly moderate price. Later on, if market requirements necessitate it, another plant can be erected to consume the following raw material tonnage per normal 8-hour day of operation:

Portland Cement	Approx. 24 tons/3 shift day
Asbestos Fiber	Approx. 3 tons/3 shift day

Profit of 80% realizable

It is estimated that the desired production capacity of the proposed plant should be 1,000 sheets of 4' by 8' by 3/16 inch wallboard per 8-hour day. A plant of this capacity would require a total capitalization of approximately ₱1,100,000 and would provide employment for approximately 100 skilled and semi-skilled workers. An estimated profit of more than 80 per cent could be realized if products were sold at current market prices. With the aim, however, of considerably reducing construction costs, it is proposed that products be sold at the lowest price at which a 10 per cent net return on capital investment would be realized.

Vitreous Tiles

Wide usage in construction field

Vitreous tile products find wide usage in the construction field, particularly for inside work in moderately priced or expensive residences or in office buildings. Although lumber prices have recently decreased and still further decreases may be expected, the products, because of their durability to withstand wide temperature changes and competitive costs, are expected to be in demand for some time to come.

The manufacture of vitreous tiles requires raw materials in the form of sand, clay and water, all of which are available locally in adequate quantities and at reasonable cost. Because of the nature of the manufacturing operation, tile plants are usually operated in conjunction with brick plants. This measure provides a substantial decrease in operating and management costs. However, the financial investigation advanced herein is predicated on the basis of a separate plant.

Although tile products are produced in various sizes and shapes and no set standards exist, for purposes of investigation a tile of 6" x 6" x ½" has been selected as an arbitrary standard.

It is proposed that a plant of 400 tile daily capacity be established. It is estimated that such a plant would require a capital investment of ₱1,250,000 and that an annual percentage return of approximately 7 per cent may be expected therefrom. Employment would be provided for approximately 40 skilled and semi-skilled workers.

BRICK MANUFACTURING

Several small brick plants

At the present time there are several small privately owned brick factories operating in the Philippines. However, it is felt that the establishment of additional brick manufacturing facilities may be entirely in order. The demand for this product is certain and will not decrease for some time, the manufacturing costs are not high, the necessary raw materials are not critical and the finished product may assuredly be sold at competitive and fair prices.

The raw materials utilized in the manufacture of bricks by the soft mud process are clay, sand, coal and water. These raw materials are available in sufficient quantities and at reasonable cost.

Potential market for 18,000,000 bricks per year for next 10 years

It is estimated that there exists in the Philippines a potential market for 18,000,000 bricks per year for the next 10 years. In spite of the fact that one large plant may produce bricks at a lower unit cost than several smaller plants, it is felt that this industry should be established in stages and that there should be decentralization wherever possible.

The estimated capital requirement for the establishment of a brick plant or plants capable of producing 18,000,000 bricks per year is approximately ₱3,000,000. An annual return on capital investment, based on a fair sales price of all production, is estimated at 8 per cent.

FOOD AND FARM PRODUCTS

RICE RANKS AS the principal item of food in the diet of the Filipino people. Unfortunately, the domestic production of rice has never, even in pre-war years, been sufficient to meet normal consumption demands. During the war years, and particularly during the liberation period, the normal production of rice was further interrupted as a result of military action and trends incident thereto. Since the cessation of hostilities heavy importation of rice and other staple foods, particularly wheat flour, has been necessary.

Philippine farmers were handicapped in planting rice, their staple food crop, by a serious shortage of work animals, plows, and seeds, as well as inadequate rainfall and damage to irrigation systems. Danger from Japanese stragglers and armed bandits, and social unrest in some of the principal rice-producing Provinces, also retarded rehabilitation of the rice industry. The final assessment of the 1945-46 crop, made by UNRRA and the Philippine Department of Agriculture and Commerce, estimated the yield at approximately 70 per cent of normal, or a shortage of from 500,000 to 550,000 short tons of rice.

NARIC revived in Sept. 1945

In September, 1945, the National Rice and Corn Corporation—a pre-war Government organization—was revived for the purpose of importing and distributing rice, and at the close of the year an Agricultural Machinery and Equipment Corporation was created by the Philippine Congress to procure plows, tractors, and other needed implements for sale to farmers on easy terms. With the better supply of farm tools available for the 1946-47 season, the crop harvested in late 1946 and early 1947 was greater than the 1945-46 crop, although still considerably below normal.

Still below normal

Although all efforts are being made to rehabilitate the industry and increase production in order that this staple commodity may be made readily available to the great majority of the people at low cost, efforts are also being made to reduce the consumption of rice as a further measure to relieve the shortage which now exists. Scientists and educators are attempting to acquaint the people with the fact that the rice content of one's diet may be reduced by the substitution of other starches and foods having corresponding or higher nutritional value.

Substitutes for rice recommended

The Government is fully cognizant of the serious problems that an acute rice shortage presents to the country as a whole and understands full well the many problems which confront the industry. Every effort is being made to increase production and to stabilize the price of this basic commodity. Effective measures being taken are the creation of the Rice and Corn Administration, the present experiments being conducted on the Sabani estate and the generous allocation of funds for the expansion of rice production. The fact that the price of rice acts as an effective price barometer for other commodities has not been overlooked and price control measures are being enforced.

Effective measures now being taken

Pre-War Rice Industry

The average annual net import of rice from 1936 to 1940 was 59,000 metric tons, while the import for the period 1931 to 1940 was 34,000 metric tons. From the month of January to June of 1947, approximately 11,150 tons of rice were imported from the United States and 3,100 tons from Siam.

Although the total production from an area of 2,080,393 hectares was 53,698,780 cavanes, production was still insufficient to meet consumption demands and the commodity had to be imported yearly from abroad.

Present Status

The leading provinces in rice production are Pangasinan, Nueva Ecija, Iloilo, Negros Occidental, Bulacan and Tarlac. The marketing and distribution phases of the rice industry have been stabilized since the establishment of the NARIC. However, there are still many other problems to be considered and the expansion of NARIC control should be supported by additional legislation enacted to assure that this latter organization may guarantee an adequate supply of rice within the economic reach of the majority of the people.

Still many problems to be considered

The yield per hectare fluctuated each year from 1936 to 1941. In 1936, the yield was 20.61 cavanese per hectare. In 1937, it made a phenomenal rise to 26.69 per hectare. In 1938, it was 27.38. A decline followed until 1941, during which year the yield decreased to 23.65.

Rice yield could doubtless be improved by the introduction of scientific farming, particularly the use of machinery and modern fertilizer. The average Filipino farmer needs more than pamphlets and traveling instructors to demonstrate the proper way in which to improve traditional methods and thus increase crop yield. Experimental and model farms can and must be initiated and sponsored by the Government.

Scientific farming could improve rice yield

In other countries, farmers are encouraged to increase production and adopt modern methods by being granted substantial Government subsidies. Although subsidies may be impossible at the present time, liberal farm loans by the RFC must be advocated and directed.

Effect of the War

Extensive damage to rice paddies

The Philippines suffered a substantial decrease in production due to the extensive war damages to rice paddies and other farming areas. The estimated area planted in 1945 to 1946 was reduced to 1,653,820 hectares with an estimated production of 36,596,940 cavanes of palay. The production of rice for the year 1946-47 showed definite improvement over that of the preceding year in that the total production amounted to 46,287,500 cavanes of palay or about 82 per cent of the 1940 production.

Factors limiting rice production

The following factors considerably limit the production of rice at the present time:

1. The destruction of roads and bridges and the lack of other adequate transportation facilities.
2. The localized disturbance of peace and order in some of the rice producing areas.
3. The depletion of work animals. Losses of Philippine livestock during the Japanese occupation—so serious a factor in the agricultural economy of the nation—were estimated by the Bureau of Animal Industry at 41 per cent of the carabao population and 71 per cent of the cattle. Of the hogs, 67 per cent were reported destroyed, and 75 per cent of the goats. A Government office was created in October, 1945, to assist farmers in obtaining work animals both within the Philippines and abroad. It is hoped that when sugar planters can obtain tractors they will be willing to sell part of their carabao to the rice planters.
4. The loss of farm implements. This has been estimated at 25 per cent to 30 per cent of the pre-war supply of agricultural machinery.
5. The shortage of farm labor. This is probably one of the greatest single factors in the reduction of rice production. Unsettled conditions and the promise of high wages in the urban centers has attracted much of this labor to the now crowded cities. This economic dislocation and population displacement must be reversed in order that an adequate food supply and the reopening of new lands for rice cultivation may be assured.

Shortage of farm labor

6. Extensive damages to the irrigation systems. This program is now being studied with a view in mind of broadening and

rehabilitating the upland rice areas by irrigation methods.

7. The wide shortage of seedlings.

Measures Taken

1. Negotiations are being conducted for the importation of work animals to the Philippines from abroad. However, lack of transportation and current livestock prices are deterrent factors to the completion of this program.

2. The UNRRA has promised aid in the form of farm implements for increasing cultivation but latest reports state that these shipments have been delayed.

3. The Agricultural Machinery and Equipment Corporation has embarked on a program for the manufacture of agricultural implements. This corporation has engaged extensively in the repair of tractors and the manufacture of simple animal-drawn plows.

4. Experiments are being conductd in the use of mechanized equipment in an effort to increase production and acreage cultivation.

Conclusion

Little encouragement seen for next season

Little encouragement can be seen for the next harvest season. Although the government program is sound, delays incident to the development of the program cannot be overcome sufficiently to produce the anticipated result immediately. It suffices to say that the proper measures are being taken and that progress is being made.

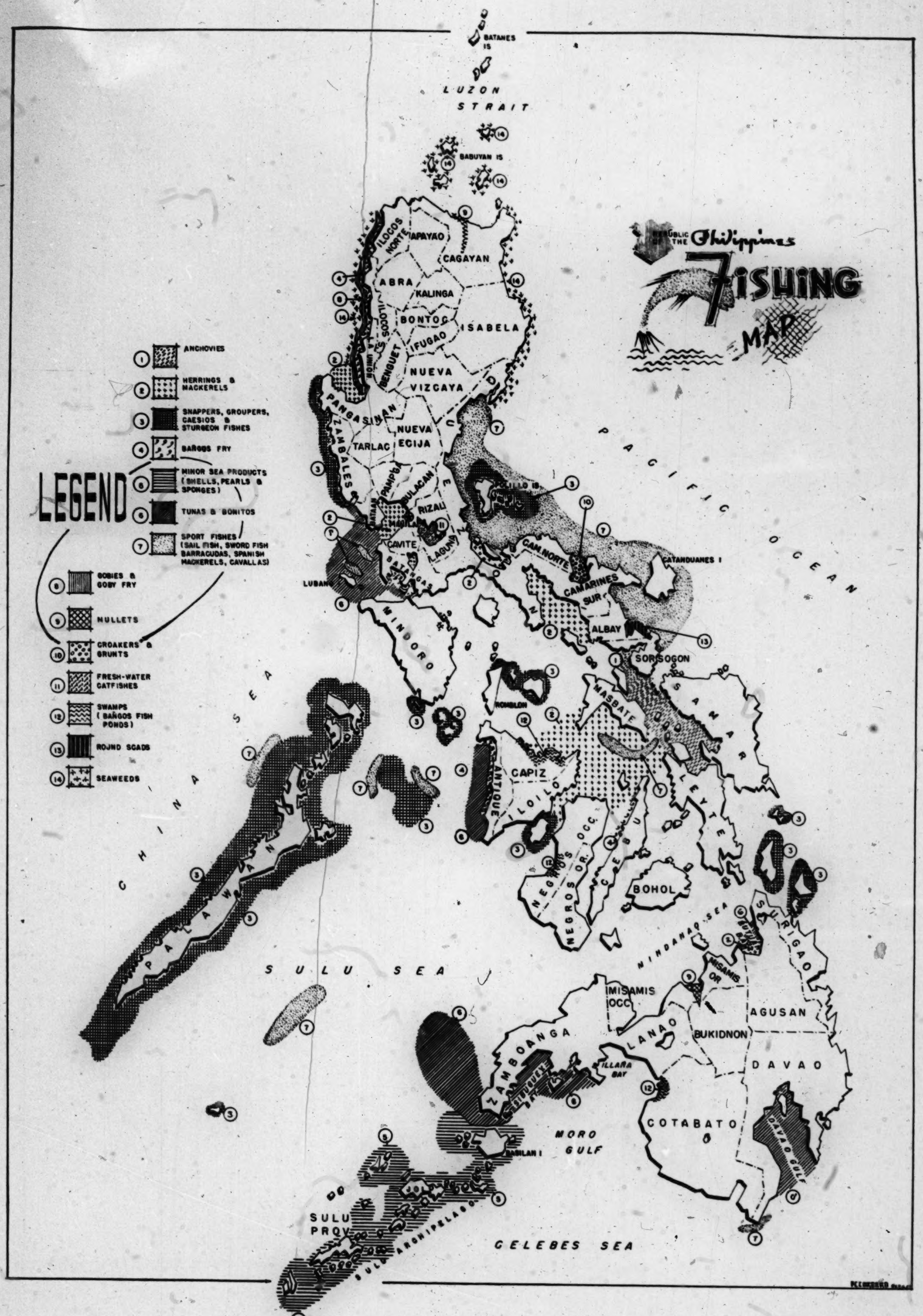
RICE BRAN OIL

Rice bran oil has many uses, the most important of which appear to be those of crude oil for soap making and as a substitute for soy bean and coconut oils. It is used not infrequently as a salad oil and as an oil in other edible compounds. The residue from rice bran oil processing plants is primarily used for fertilizer and for animal fodder.

As far as is now known, no plant for the processing of rice bran oil has been established in the Philippines, although the Japanese are known to have conducted many experiments which led to the establishment of a considerable industry within their islands.

Extremely advisable in Philippines

In view of the rapid and profitable development of this industry in Japan prior to the war, it is felt that similar development would be extremely advisable in the Philippines. It is recommended that at least one such plant be established in the Republic, mainly for the conducting of research work on this product. No doubt exists that the total production of the proposed plant could be readily sold on the open market.



Republic of the Philippines Fishing Map

LEGEND
① ANCHOVIES
② HERRINGS & MACKERELS
③ SNAPPERS, GROUPERS, CAESIOS & STURGEON FISHES
④ BAÑGOS FRY
⑤ MINOR SEA PRODUCTS (SHELLS, PEARLS & SPONGES)
⑥ TUNAS & BONITOS
⑦ SPORT FISHES (SAIL FISH, SWORD FISH BARRACUDAS, SPANISH MACKERELS, CAVALLAS)
⑧ GOBIES & GOBY FRY
⑨ MULLETS
⑩ CROAKERS & GRUNTS
⑪ FRESH-WATER CATFISHES
⑫ SWAMPS (BAÑGOS FISH PONDS)
⑬ ROJND SCADS
⑭ SEAWEEDS
BATANES IS
LUZON STRAIT
BABUYAN IS
ILOCOS NORTE
APAYAO
CAGAYAN
ABRA
KALINGA
BONTOC
ISABELA
ILOCOS SUR
LA UNION
BENGUET
IFUGAO
NUEVA VIZCAYA
PANGASINAN
ZAMBALES
TARLAC
NUEVA ECIJA
PAMPANGA
BULACAN
BATAAN
MANILA
RIZAL
CAVITE
LAGUNA
BATANGAS
LUBANG
PACIFIC OCEAN
CAM. NORTE
CAMARINES SUR
CATANDUANES I
ALBAY
SORSOGON
MINDORO
ROMBLON
MASBATE
SAMAR
LEYTE
CAPIZ
ANTIQUE
ILOILO
NEGROS OCC.
NEGROS OR.
CEBU
BOHOL
SURIGAO
MINDANAO SEA
MISAMIS OR.
MISAMIS OCC.
AGUSAN
BUKIDNON
LANAO
DAVAO
ZAMBOANGA
ILLANA BAY
COTABATO
DAVAO GULF
MORO GULF
BASILAN I
SULU PROV.
SULU ARCHIPELAGO
CELEBES SEA
SULU SEA
CHINA SEA
PALAWAN

The proposed plant should be established in the vicinity of Manila, a location which would provide a ready source of raw materials in the form of fresh rice bran. Estimated capital required for the establishment of a processing plant of 100 tons daily capacity is ₱750,000.

FISHING INDUSTRIES

Fish production in the Philippines has never been sufficient to meet consumption demands or normal dietary requirements. With the increase in population and the growing desire for a higher standard of living, yearly consumption demands are increasing. It is estimated that approximately 500,000,000 kgs. are needed to satisfy consumption demands and to provide an adequate diet for the population. The following pre-war figures indicate that production must be nearly tripled if requirements are to be met.

Not sufficient to meet normal dietary demands

Production	175,000,000	kgs.
Imports	11,000,000	"
Exports	1,000,000	"
Consumption	187,000,000	"

The principal fishing resources of the Philippines may be divided as follows: pond culture, in-shore fisheries and off-shore or deep sea fisheries. Of these, only pond culture and off-shore fishing can be considered as being capable of expansion on the scale required. In-shore fishing grounds, due to the general narrowness of the continental shelf, are definitely limited in area and are capable of only a certain maximum yield.

Principal fishing resources in P. I.

Pond Culture

Prior to the war, pond culture, carried on in a total of 60,000 hectares, produced approximately 20,000,000 kgs. of bangus, or an average production of 350 kgs. per hectare. Of the 60,000 hectares producing pre-war, approximately 30,000 are now producing. An estimated 15,000 hectares are in need of rehabilitation. The estimated cost of such rehabilitation is ₱20,000 per hectare. There are an additional 400,000 hectares of vacant marsh and swamp lands available of which an estimated 200,000 hectares are believed to be suitable for bangus production. New construction at a rate of 10,000 hectares a year is believed possible, at an average cost of ₱875 per hectare, including organization and survey expense. It is evident that maximum production cannot be achieved for a period of some years. The following production and cost estimates are

Cannot be achieved for period of years made:

	1947	1948	1949	1950	1951
Production (thousand kgs.)	12,250	17,500	24,500	28,000	31,500
Cost (thousand pesos)					
Rehabilitation	1,000	2,000			
Expansion		8,750	8,750	8,750	8,750

Inasmuch as all of the required capital probably cannot be secured from either private or government or combination sources, progressive capitalization based on a revolving fund is recommended. A large percentage of rehabilitation costs will be supplied by war damage claims.

Off-Shore or Deep Sea Fishing

Prior to the war, several unsuccessful attempts were made by foreign organizations to exploit the off-shore fishing industry. Only the Japanese were able to pursue this enterprise successfully on a rather small scale in connection with a cannery which they maintained at Zamboanga, Mindanao.

Early development is very important

Considering the vast untapped potential of this industry, its early development is of utmost importance. Because of the nature of the enterprise, however, it will be necessary that developmental progress be directed and controlled in order that desired results may be obtained. The rate of development and the production results will depend largely upon the capital made available. Estimated capital investment required is ₱60 per ton of fish produced per year based on increments of 2,000 tons. This figure does not include the cannery phase because once production reaches the point where canning is commercially sound, the financing of suitable cannery facilities will present no problem. The following production and cost estimates are made:

	1947	1948	1949	1950	1951
Production (tons)		650	19,500	32,500	52,000
Costs (Thousand pesos)	400	800	800	1,200	1,200

In-Shore Fishing

Not capable of wide expansion

Commercial in-shore fishing is not capable of wide expansion. Because of the general narrowness of the continental shelf, the workable fishing grounds are definitely limited and only by a comprehensive and extensive fishery management program and rigid conservational control can the maximum yield be maintained. The maximum estimated yearly yield from in-shore fishing operations is

150,000,000 kgs. The rehabilitation and expansion of this phase of the industry should be confined to the increase of production efficiency.

Discussion

While some phases of the Philippine fishing industry are so efficient as constantly to threaten depletion of certain fishing grounds, overall production efficiency or production per man is so low that the industry ranks among the lowest in the world in this respect. In all phases of the industry the introduction of comprehensive mechanization, standardization of craft and equipment and the introduction of new and scientific fishing methods will materially raise production efficiency. Cost estimates of this program as as follows:

Now ranked among lowest in world

	1947	*1948*	*1949*	*1950*	*1951*
Costs (thousand pesos)	75	150	500	500	500

Because production has always been less than consumption demands, there has been no great need for storage facilities, produce moving rapidly and being sold fresh. With the increase in production it will be necessary that distribution and marketing channels be developed to provide for rapid and widespread movement of produce from the producer to the consumer. Estimated cost requirements are as follows:

Production smaller than consumption

(Thousands of Pesos)

	1947	*1948*	*1949*	*1950*	*1951*
Docking facilities	50	100	100	100	100
Ice and cold storage	50	200	300	300	300
Transportation	50	150	150	150	150
Marketing	50	100	100	100	100
Total	200	550	650	650	650

Inasmuch as production is not expected to meet consumption demands within the five year period covered, it is felt that the processing phase of the industry need not be considered at this time.

Processing need not be considered

Summary

Owing to the general complexity of the industry, the inter-relation of its various phases and the difficult reconciliation of private and Government capital, a condensed report cannot hope adequately to cover the subject. An expanded and more complete report is available for reference.

Yearly production in tons

	Yearly Production In Tons				
	1947	*1948*	*1949*	*1950*	*1951*
Pond culture	12,250	17,500	24,500	28,000	31,500
Off-shore	——	6,500	19,500	32,500	52,000
In-shore	75,000	75,000	100,000	125,000	150,000
Other	1,000	15,000	25,000	40,000	60,000
Total	88,250	114,000	169,000	225,500	293,500

Yearly costs in pesos

	Yearly Costs (Thousand Pesos)					
	1947	*1948*	*1949*	*1950*	*1951*	*Total*
Pond culture	1,000	10,750	8,750	8,750	8,750	38,000
Off-shore Fisheries	400	800	800	1,200	1,200	4,400
Production Efficiency	75	150	500	500	500	2,700
Marketing & Distribution	200	550	650	650	650	2,700
Total	1,675	12,250	10,700	11,100	11,100	46,825

Because of the fact that the investments will vary as to amounts, individuals, and entities, no financial statement as to expected yield is possible. If is, of course, a fact that this industry has always been very profitable.

Livestock Industry

Tremendous loss in livestock during war

The Philippines suffered a tremendous loss in livestock during the Japanese occupation, as has already been pointed out. Pre-war Philippine meat production was estimated at 90,000 tons annually while imports averaged 4,500 tons.

In addition to the production of meat and dairy products, there existed a considerable tanning industry, but production capacity was not sufficient for local demands. Green hides were exported and tanned hides were imported.

Dairying has only been carried on in a very small way. The main reason for this is that there is a definite shortage of grazing lands adjacent to the larger population centers. Production and transportation costs further add to the difficulty, putting this product out of reach for the majority of people.

Educational work will be necessary

Furthermore, the habitual dietary requirements are such that considerable educational work would be necessary to bring this valuable food product into wide usage. Except for the few dairies supplying the American, European or high income group market, dairying was mainly carried on by families for their own supply.

Borden's milk is now being imported and finds a ready market in the Philippines, so much so that the demand for this frozen milk is greater than the present supply can meet.

Borden's milk has ready market here

No accurate census has as yet been taken as to the livestock losses suffered during the war, but some estimates run as high as 35 per cent loss. With the increase in population it is evident that production must be tremendously increased in order that consumption demands may be met.

Meat prices today are many times higher than they were before the war. For this reason, a large portion of the population has switched to canned foodstuffs, mostly imported from the United States. Slaughtering has decreased owing to the scarcity of animals.

Meat prices today many times higher

Inasmuch as the greater portion of livestock is being slaughtered, including those work and breeding animals the slaughter of which is biologically unsound, the rate of depletion of present stock is alarming. It is obvious that sufficient imports must be effected to render this unwise practice not only unnecessary but financially unsound. At the same time, steps must be taken to replenish the breeding herds, preferrably with the most suitable stock available.

Breeding herds must be replenished

Resources

The islands have suitable grazing lands available for the maintenance of herds of sufficient size to supply consumption demands. Large areas in Mindanao, Mindoro, Masbate, and other islands whose altitudes and climates are of a more temperate nature will provide ample grazing and pasture lands for both cattle and sheep. Although some of the grasslands are not suitable for range and pasture, there are grasses and legumes which have been imported from countries having tropical and temperate climates that are definitely suitable. Corn for the fattening of livestock can be grown in ample quantities.

Ample grazing and pasture lands for cattle and sheep

Discussion

The anticipated program for preservation and expansion of present stock is as follows:

1. Rigid prohibition of slaughter of work or breeding stock.
2. Importation of sufficient meats or stock for slaughter.
3. Importation of stock for breeding purposes.

Anticipated program

In addition, it is felt that research regarding the possibility of large scale sheep raising should be initiated without delay.

The problem of instituting a program that will insure increased production is not, in itself, difficult. The difficulty lies in the acquisition of sufficient funds to accelerate and complete the program. A sum of ₱1,500,000 has been appropriated for the purpose of purchasing livestock but this amount is very small as compared to the total required. To rehabilitate the industry, an estimated 2,000 head of livestock per month must be imported for the next 5 to 10 years. Considering that each animal will cost approximately ₱1,000 pesos delivered in the Philippines, the total cost would amount to ₱24,000,000 per year, obviously a considerable amount. On the other hand, it is doubtful that it is physically possible to import and distribute this volume of stock. It is understood that the Indian government has certain limitations for cattle export and most American and Australian cattle are not considered suitable for use in this climate. The mechanics of proper distribution and the policy for financing all phases of the program need to be considered and a definite plan must be developed.

Definite plan is necessary

As neither government nor private enterprise, or even a combination of both, are in a position to support a program of this magnitude, it is recommended that a revolving fund be established to initiate the program and that more money be added to this fund as needed or as seems practicable. It is evident that the Government must adopt a broad policy of financial assistance to the extent of its ability and that private financing institutions must be urged and encouraged to extend liberal loans.

Increased livestock production will necessitate a considerable increase in slaughterhouse and packing facilities. Also, in addition to tanned hides, there may be produced sizable quantities of by-products such as bone meal, glue, fertilizer, etc., all of which will need special facilities. The extent to which additional slaughter, refrigerated shipping, tanning and by-product processing facilities must be developed will depend largely upon the rate at which livestock production is expanded.

Depends on expansion rate of livestock production in P.I.

Although no accurate expenditure figures can be forecast, it is felt that the following estimates as to minimum expenditures may be considered:

	Thousands of Pesos				
	1947	*1948*	*1949*	*1950*	*1951*
Replacement of livestock	2000	4000	4000	4000	4000
Packing & Slaughter	150	200	300	300	400

Tanning	100	100	200	200	200
Total	2250	4300	4500	4500	4600

Leather Manufacture

More leather products are imported than are produced locally, despite the fact that there are tanneries throughout the Islands producing leather for slippers, harnesses and shoes. While the export of leather is very small, imports consisting mainly of shoes, sole leather, upper and lining leather, handbags and similar products amounted to approximately ₱3,000,000 in 1938. A sizable quantity of glue, which is a by-product of leather manufacture, is also imported to the amount of ₱74,000 annually.

Establishment of new factories is warranted

The local market demand warrants the establishment of a few medium size tanning factories. These factories may require anywhere from ₱5,000 to ₱100,000 capitalization.

Among the most important materials in the manufacture of leather are hides and skins. The expensive items in the cost of production are:

Expensive items in production

1. Lime, salt, acids (sulphuric acid, hydrochloric acid).
2. Alkalis (sodium carbonate, sodium bicarbonate, borax, and others).
3. Chrome tan (chromium sulphate, chromium chloride, sodium bichromate, sodium thiosulphate and others).
4. Vegetable tans (barks, leaves and similar materials of their extract).
5. Dyes (either synthetic or natural).
6. Finishing materials (shellac, casein or other protein substances, inorganic pigments and others).

In general, it may be said that all these materials are obtainable or can be produced in the Philippines.

Many other sources found extensively in Philippines

To improve the quality of Philippine hides and skins, special care must be observed in the flaying and curing. Bruises, cuts and spoilage of bacterial action impart poor qualities. The tanning materials used are also an important factor in determining the quality of the leather produced. These are vegetans, chrome tans, lime, salt, acids and alkalis. For vegetable tan, "cutch", the extract from bakawan, is plentiful. Besides mangrove, many other sources are found extensively in the Philippines. Among these are kamachile bark, now the most popular tanning material in the local tanneries, anabiong, bitaog, kalumpit and kariskis barks, the betel nut and many others which have not yet been used in a commercial scale.

Ore reserve of 8,000,000 tons

Regarding chrome tans, there is no local production of bichromates from chromite, which exists abundantly in the country. In the Masinloc District of Zambales alone, there is an ore reserve of over 8,000,000 tons. There are abundant local deposits of limestone, and salt is produced by evaporation of sea water as has already been pointed out.

It is hoped that sulphuric acid and sodium carbonate will be available when the proposed chemical plants as part of the Japanese war reparations or purchased new are placed into operation.

Taking the figures for the number of animals slaughtered in 1937, the total amount of reagents required annually for converting hides and skins into leather is indicated as follows:

Reagent	*Tons*
Lime	900
Salt	6,500
Sulphuric Acid	3
Sodium Carbonate	3
Tanolin	13
Vegetable Tan Extract	6,400
Total	13,819

The above table shows that the requirements for lime and salt are within the volume of local production, while requirements for vegetable tan extract can be supplied by a factory as large as the one formerly operating in Zamboanga.

Many other materials are used in the manufacture of leather. Among these are bating materials, dyes, sulphanated oils, scaps, finishes of every kind, and solvents. These, however, are not important items in the cost of production of leather and may be imported without detriment to the success of the industry.

For the proposed plants to be established with the slaughterhouses, estimates indicate that ₱600,000 will be needed as capital investment.

SHOE INDUSTRY

The per capita consumption of shoes in the Philippines has always been very small for such an advanced and progressive nation.

Shoe consumption always been small

The Philippines' pre-war annual consumption of shoes, slippers, etc. excluding wooden shoes, was approximately 5,000,000

pairs. This was divided as follows:
2,000,000 leather and hand-made locally, 1,000,000 leather and machine-made locally; 1,800,000 rubber; 200,000 leather and imported.

Pre-war production was handled by five large commercial factories, and thousands of home factories. Filipino shoe workers are renowned for their skill in making hand-made shoes, but there exists a real shortage of skilled machine workers. The shortage of these men and of machines is the greatest current handicap to the industry.

Real shortage of skilled workers

The population is becoming more shoe conscious. The public demand has shown very marked fluctuations as to quality, style, and price, and it is therefore difficult to predict future trends and preferences. It seems reasonable to predict, however, that for the next five years, the hand-made shoes will continue to advance while demand for machine made shoes will remain fairly constant.

Population now becoming more shoe conscious

Raw materials for leather shoes are chiefly imported from the United States, but ample supplies of crude rubber are produced locally. The present policy of the government is to aid the rubber shoe manufacturers by limiting imports of rubber shoes, and placing a ceiling on prices of crude and finished products.

Present manufacturing capacity for both kinds of shoes is ample for present demand and future expectations, and this business is not apt to attract new additions from local or foreign capital. Five fairly large factories produced the bulk of the pre-war demand for machine-made leather shoes. Two of the pre-war manufacturers have completely rehabilitated their plants and are in production, and two more are expected to start production shortly. All three of the pre-war rubber-shoe producers have reopened their plants and are capable of producing their pre-war capacity of 13,000 pairs daily. Current production is approximately 5,000 pairs daily, although this is presently being increased because of reduction of imports.

Prices are still much too high on both kinds of shoes and this naturally affects demand. Wages paid have been materially increased and the following statement will show some relative figures. Pre-war wages paid by rubber shoes manufacturers have risen from ₱.80 to ₱5.00 while prices have also changed from ₱.80 to ₱4.00.

Prices still much too high

The government-owned National Footwear Corporation was initiated in order to protect the many small craftsmen and house-operated industry of shoe-making. This has served a useful purpose very well, but there is still room for much improvement. Private importers and contractors still make it extremely difficult for the small shop operator and home factory to remain in business and many skilled craftsmen are still in need of employment.

Conclusion

The Government could serve the entire industry by controlling both imports and exports of leather and strictly limiting the imports of all kinds of shoes.

The Government should also offer to sell the National Footwear Corporation to a cooperative organization of local small manufacturers. This should be done on the basis of Government control and supervision. It would serve to bring all factors into the business and would eliminate much current agitation and criticism.

Partial mechanization would improve quality

Partial mechanization would tend to improve quality, reduce prices and thus increase demand and production.

SUGAR

The core of Philippine economy for many years has been centered in the production for export of a relatively few major commodities. Heading the list was sugar, followed closely in recent years by gold and base metals. Coconut products, abaca and cordage, and tobacco products completed the list. Of all these industries, the war took its toll—of some more heavily than of others.

In the field of sugar production, six of the 43 mills in operation when the war started were completely destroyed. Four of them were severely damaged and at least eight were about 50 per cent demolished. The remainder escaped with moderate or slight destruction.

Severe damage sustained — three seasons required to reach pre-war acreage

It is estimated that ₱270,000,000 will be required to bring sugar-milling capacity to the level of pre-war production. Owing to the lack of cultivation during the war years, planting will take about three seasons to reach pre-war acreage, according to most estimates.

Under the agreement between the United States and the Philippines, signed in Manila on July 4, 1946, the Philippine sugar export quota to the United States will remain at 800,000 long tons of centrifugal sugar and 50,000 tons of refined sugar. After 1954, however, duty will be imposed on this commodity, increasing gradually until it equals the Cuban duty in 1974.

Production costs higher than Cuba

Philippine sugar production costs have been constantly higher than Cuban costs. It is believed, however, that by improvement of strains and milling processes the Philippines may be able to retain the American market. Sugar exports in 1947-1948 are expected to amount to about 280,000 tons, according to the predictions of local sugar economists.

Philippine sugar planters, deprived of revenue for previous years, and finding it difficult or impossible to finance 18 months or more of planting, at first disposed of their cane to distillers at very high prices, and it was soon apparent that but little sugar could be produced in the 1946-47 grinding season. Late in 1945 an executive order prohibited the use of sugar or cane juices in the manufacture of alcohol except for medicinal and industrial purposes, and, with demand for beverage alcohol declining as the supply of imported liquors increased, it seemed probable that the diversion of sugar cane to alcohol would no longer be a problem.

In July 1945, the Philippine Government granted the sugar industry a credit of ₱4,500,000, but, because of technicalities governing loans, the credit was not fully used by the end of the year. For the 1945-46 crop a total of 28,530 acres was available for harvesting, and at the end of 1945 it was estimated that about 12,500 short tons of centrifugal sugar were produced by the six centrals.

Loan of ₱4,500,000 granted by Govt. Very high prices

Prior to the war there were 43 sugar centrals in operation. At the present time there are 15 in actual operation and an additional 5 are expected to resume operations prior to the end of this season. On this basis, local sugar economists estimate that the Philippines will be able to export 280,000 tons of sugar during the 1947-1948 season. In view of the fact that the best pre-war crop was 1,500,000 tons it may be said that rehabilitation of the industry has been remarkable, especially considering the extent of war damages, the dissention that has existed between labor, planters and refiners, the fact that no war damages have yet been paid, the past inflationary trend, the lack of financial assistance and the difficulty encountered in securing construction materials, machinery and equipment.

15 centrals now in operation

Although the current advantageous price structure, world demands, and the tax-free entry of sugar into the United States are definitely favorable factors, it is felt that the present is a propitious time for insuring the position of all phases of the sugar industry by the institution of a sound, well planned and efficiently executed overall policy. With this in mind the following recommendations are made:

Sound, well-planned overall policy is needed

1. That the Sugar Administration, in close cooperation with representatives of the Philippine Sugar Association and the Confederation of Planters, form a special committee to study the needs of all domestic phases of the sugar industry, with a view in mind of accelerated rehabilitation and expansion, and to accurately sur-

vey the future potential of the industry with special regard being given to world conditions, United States and world markets, future price possibilities, new inventions and sugar substitutes.

2. That as a result of this study and survey, the government, in conference with the survey group and other members of the Sugar Association and Confederation of Planters as may be deemed advisable, establish a definite plan equitable and agreeable to all regarding expansion of the industry, production control, licensing of centrals, quotas, price control, marketing procedures, reparations and war damage claims, financial assistance and future policy.

3. That the projected policy be kept current by the continuance of a survey group whose responsibility it would be to recommend measures, legislative or otherwise, to be taken which are felt to be in the best interests of the industry in part or as a whole and to government at any time.

It is sincerely felt that the cooperative attitude and the joint assuming of responsibility will be of definite and incalculable value to each and every phase of the industry and to Philippine economy in its entirety.

Alcohol

Linked with sugar is the alcohol industry.

Invaluable aid to rehabilitation of sugar industry

The establishment of an alcohol distillery would not only be a profitable business proposition but would also constitute a valuable aid in the rehabilitation of the sugar industry. With the eventual imposition of full duty on sugar exported to the United States after the expiration of the period of grace provided for in the Bell Trade Act, the Philippine Sugar industry faces severe foreign competition unless action can be taken to reduce the cost of production to such extent as to enable the industry to withstand competition from other sugar producing countries. The utilization of the by-products of the sugar industry is a step towards this end.

The basic raw material used in the manufacture of alcohol is molasses—a by-product of sugar. Before the establishment of alcohol distilleries, most of the molasses produced was exported to the neighboring countries of China, Japan, Hongkong and Siam. The exportation to these countries amounted to 16,355,424 kilos in 1939 but dropped to 1,576,840 kilos in 1940, when alcohol production was at its peak. It is estimated that the Philippines produced a maximum of approximately 56,000,000 gallons of final molasses which, when converted to alcohol, would amount to approximately 22,400,000 gallons. These figures represent only the

molasses produced in the centrifugal sugar mills and does not include the amount produced in the antiquated "panocha" and "muscovado" sugar mills. It can be readily seen that there exists a wide field for expansion of the alcohol industry insofar as raw materials are concerned.

Wide field for expansion of alcohol industry

The foreign demand for alcohol has continually increased by reason of its economically useful properties as a solvent and its use in the synthesis of other chemicals. In the United States, the largest direct consumer uses are as an antifreeze, as a solvent in surface coatings and as a dehydrating and moistening agent in various cellulose nitrates. In the Philippines, alcohol is denatured for industrial purposes and is used in the manufacture of motor fuel. A sizable portion of the production is used in the manufacture of wines and liquors, one of the Philippine export products.

It is proposed that eight alcohol distilleries with a combined annual capacity of 2,500,000 gallons of alcohol be established to replace the distilleries destroyed by the war and to utilize the excess molasses which has in the past been exported in the raw form.

With the establishment of the alcohol plants of the proposed capacities, local and export demands for rectified alcohol for use in the manufacture of wines and liquors and for industrial purposes can be met.

Financial Investigation (8 distilleries)

Capacity — 2,500,000 gallons alcohol annually

Total investment	₱8,255,770
Estimated gross income	585,227
Total yearly operation cost	3,199,773
Annual return on capital investment.	7.05%

The reduction and distillation of nipa and coconut juices and cassava, rice, corn and camote starches as possible sources of alcohol has been suggested. Investigation will determine to what extent these added sources will be able to furnish raw materials.

Bagasse Wallboard

A tremendous amount of bagasse is produced by all of the sugar centrals as it is a by-product which comes from the processing of sugar cane.

Experiments in the field of wallboard manufacture have been numerous in recent years, especially in view of the desirability of developing an inexpensive product which can be used as a parti-

Many experiments been made during recent years

tioning, lining or insulating material in building to replace lumber or other expensive and critical items. The present world and local shortage, due to war damages and other factors, emphasizes these needs.

Of the new experimental types considered, only that utilizing bagasse as its chief raw material is considered perfect, all tests having been completed and the product having met standard requirements. Australian and American companies possess the patent rights on the necessary equipment and manufacture complete plants for industrial sale.

Raw material costs will be reduced to minimum

The bagasse wallboard manufacturing unit should be operated in conjunction with the sugar central in order that common power, water and transportation facilities may be utilized, that raw material costs will be reduced to the minimum, and in order that full advantage may be taken of the "slack" season after the sugar crop has been processed.

A complete bagasse wallboard manufacturing plant capable of producing 50,000 square feet per day will require an estimated capital of ₱1,132,500. This amount includes adequate working and reserve capital.

Corn

Second staple food of Philippines

Corn is rated as the second staple food of the Philippines. As a result of widespread publicity and a progressive educational program it is becoming more widely used and has been steadily replacing rice as the main item on the national diet. Not only does corn contain more nutritional value than rice, but it may also be utilized in the form of starch, soap and oil.

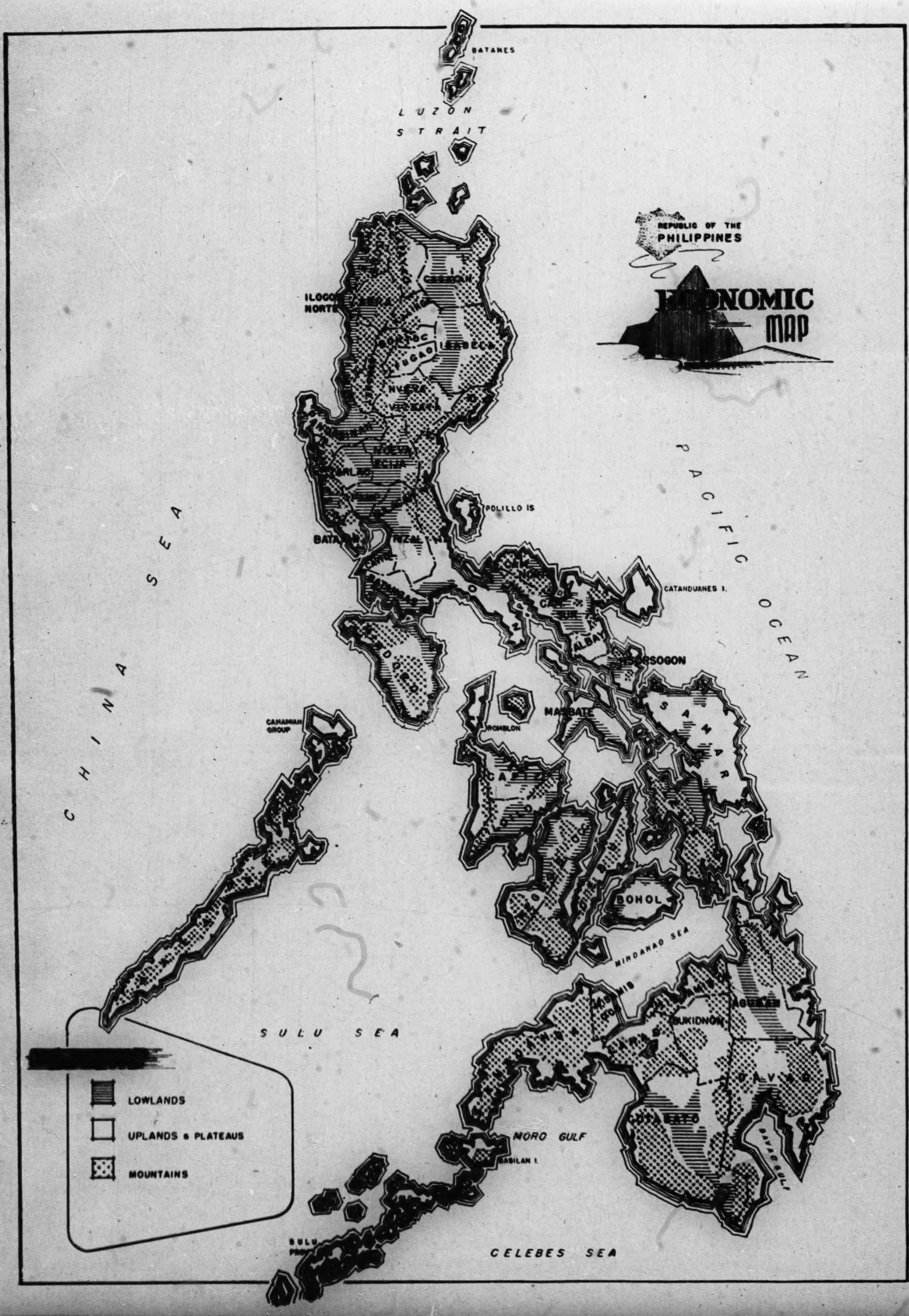
Because of the fact that corn can be grown in a hotter, more dry climate than rice, many rice-producing sections have turned to the production of corn. Corn is a more hardy crop and does not require the attention necessary for the proper cultivation of rice.

Rehabilitation made excellent progress

The corn crop for the present year appears to be ample, the crop being estimated at 8,328,140 cavanes. There are approximately 776,940 hectares under cultivation. These facts would indicate that rehabilitation has made excellent progress and, with resumption of normalcy in the Philippines, corn production should continue to increase.

Fruits, Nuts, Vegetables

Fruits and nuts have never been a relatively large crop in the Philippines and these products are usually consumed at or near the place of origin. Comparatively little production enters into


REPUBLIC OF THE PHILIPPINES
ECONOMIC MAP
BATANES
LUZON STRAIT
ILOCOS NORTE
CAGAYAN
ABRA
BONTOC
IFUGAO
ISABELA
NUEVA VIZCAYA
PANGASINAN
TARLAC
NUEVA ECIJA
BATAAN
RIZAL
POLILLO IS
CATANDUANES I.
SUR
ALBAY
SORSOGON
SAMAR
MASBATE
ROMBLON
CAPIZ
BOHOL
MINDANAO SEA
CAGAYAN GROUP
MISAMIS
BUKIDNON
AGUSAN
DAVAO
COTABATO
DAVAO GULF
MORO GULF
BASILAN I.
SULU PROV.
PACIFIC OCEAN
CHINA SEA
SULU SEA
CELEBES SEA
[redacted]
LOWLANDS
UPLANDS & PLATEAUS
MOUNTAINS

island commerce and little has ever been exported. Important exceptions to this rule are pineapples, bananas and mangoes. Mangoes are exported to China in fairly large quantities. When packing and handling becomes standardized and practical, the export of these fruits may be considerably expanded.

Important exceptions are bananas, mangoes and pineapples.

In recent years, there has been a very definite decline in the use of nuts as a source of oil. Oil and fatty substances that were previously drawn from nuts are now extracted from soy bean, corn and cotton seed.

Soy beans offer a good potential crop for the islands. Extensive experimentation in the United States and other countries has revealed many uses to which the product may be put. The acreage to be planted and the location of this acreage would depend largely on the final usage of the product.

Soy beans offer good potential crop for islands

The planting of peanuts in the upland rice and corn areas will provide crop diversification and enrichment of soil. The farmers in the area would then benefit by an additional paying crop during the off season for rice. Processing possibilities are mentioned in a later section of this report and mention has been made of the experiments now being conducted by the National Development Company on the Sabani estate in connection with the planting of peanuts on a commercial scale

Pili and cashew nuts have been processed into a palatable table wine, the bouquet being quite similar to that of a light-bodied sherry.

Palatable wine like sherry

The Baguio district produces onions, tomatoes, cabbages and many other staple products. Much of this is shipped to the Manila markets within relatively few hours after picking.

The lime group, consisting of oranges, pomelos, lemons and the true lime (kalamansit) is grown in Batangas, where there are very large groves under the care of the Bureau of Plant Industry, who started this lime in the Philippines.

Oranges, pomelos, lemons, true lime

An interesting point is the considerable importation of oranges, grapes, pears, apples and other American grown fruits totalling in value some ₱20,000,000 annually to a country which produces a wide variety of this food. Oranges (called "cahel") are cultivated in commercial orchards throughout the country. Further experiments are recommended in order to determine whether American varieties of juice oranges could be produced in the higher altitudes of the Republic.

In Lanao there are a quantity of small organges grown, which are similar to the Mandarin orange from Amoy, from which province undoubtedly either the seeds or the seedlings were brought into Mindanao by Chinese residents or travellers from China.

Garlic

Garlic is grown mostly in Ilocos from seeds that came originally from China. Some seeds have now been developed that produced very good garlic heads.

More attention should be given to this industry as the Philippines is a garlic-eating country. At present garlic is imported in great quantities, chiefly from China and Mexico, and annual imports total as much as ₱1,000,000.

Onions

Main onion areas

The onions grown in the Philippines are sweet, aromatic, and possess a special tang and taste that is unsurpassed by any other onion in the world. The main onion areas are in Bongabong and Cala-anan, Nueva Ecija; Lemery, Batangas; and Calinas, Cavite. Although no great quantity has as yet been grown, the gardens and nurseries of the Bureau of Plant Industry and the College of Agriculture in Muñoz, in Nueva Ecija, have produced some fine specimens.

The best onion produced in this country is the one grown from Teneriffe seeds, descended from the true Spanish onion. These seeds are only good for one year. Although it has been tried time and again to use the seed obtained from mature plants, either the bulbs are too small and tasteless or the stalk is very high with no bulb at all.

Seeds have been imported from every part o fthe world and have been tested here, but so far only one has been found which is capable of producing an acceptable commercialized onion. This is the red onion seed which is imported from India.

Most popular variety in P.I.

However, it is reported that a new onion of far better quality and a great improvement on the Indian red variety has now been produced by J. Gonzales — a variety which he has named "Red Glow". This is the most universally popular variety of onion in the Philippines today.

In 1941, the Philippines exported onion bulbs to the amount of approximately ₱5,720 mostly to China and the Srtait Settlements.

Given proper care and attention, it is to be expected that in two or three years onions could be supplied not only for the local markets all the year round but also as an export item. Proper care in the packing of onion bulbs for local consumption and for export must be taught the planters by Government agencies.

Coffee and Tea

Coffee was first imported to the Philippines by the Spanish Fathers around 1770 and was planted in Bukidnon, Misamis and Lanao. The beans that they brought were those of Arabian coffee. These grew well in the fertile soil of the islands and at one time, about 100 years ago, Batangas was one of the greatest coffee producnig areas in the world, according to a local expert.

The coffee has been allowed to run wild now, but it is recommended that the industry be revived. It can be put on a producing basis in three years.

Should be revived

Tea is not grown in the Philippines and never has been. There appears to be no prospect whatsoever for the establishment of this industry.

Grains

The growing of wheat was initiated prior to the war, some hardy American strains being used in the experiments in the upland areas. Present indications are that this work is now being resumed and that there are possibilities of expansion in the production of domestically grown wheat. The other imports, barley, oats, malt and hops, are in the processes form. Yeast culture from molasses is now being developed experimentally.

Food Canning and Preserving

The possibilities of this industry are significant in that prewar activities for packing of food was slowly being developed along successful lines. So important are the development opportunities in this field it is felt that an outline of various food processing endeavours warrant presentation.

Significant possibilities

Fish—The Government-owned canneries located at Guagua, Pampanga and Capiz processed bangus, a pond-cultivated fish. The product met with good market results and although production was eventually curtailed due to the shortage of seedlings, the public demand for the commodity indicated an excellent future. During the remaining days before the Japanese attack in 1941, the Guagua cannery converted its operations to meat packing and inventoried large quantities of canned beef, the quality of which was comparable to imported varieties. The output was commandeered by the U. S. Army and in great measure contributed to the sustenance of the Army during the Bataan and Corregidor campaigns.

Considerable tonnages of tuna was processed by the Japanese in and around Zamboanga, Mindanao. The fishing equipment used was similar to the tuna long line craft popular in California waters, and shore and ship canning facilities fairly were well developed. Recently, efforts were initiated by a group of Americans to build and equip tuna boats, plus installing refrigeration and packing units later on in the program. However, reports state that the work is progressing very slowly. Crabs, shrimp, mussels, oysters, sardines and mackerel may provide new investment outlets once careful studies determine the practicability of packing and marketing.

Large plantations in Bukidnon

Fruits—The only instances of pre-war activities in this field centered around pineapple and mangoes. The Dole Pineapple Company of Hawaii developed large plantations in Bukidnon, Mindanao. The initial crops required extensive experimentation and in time proved that climatically and agronomically Mindanao was a fertile field for pineapple cultivation. Large packing units erected by the Dole Company were destroyed and are now in process of being rebuilt toward post-war efficiency, with modern housing and operating methods provided.

There was a small but increasing volume of mango packing, orders for the products being placed by American food outlets. Philippine-grown mangoes possess qualities somewhat superior to varieties produced throughout the West Indies and Latin America. The fruit tends to be less fibrous and is exceedingly savory. The export probabilities present serious interest and should be considered. Mango jam is produced in small quantities for home consumption. The flavor is similar to guava paste which is manufactured in Cuba and in comparison is equal in delicacy. The combined development of mango products including chutney, lends itself to a small but profitable export business.

Dehydration of papaya, bananas

Other packing and dehydrating possibilities are those of papaya and bananas. Methodic development of this industry can take place as demands indicate.

Strawberries are grown in the Baguio area, and undoubtedly grapes can also be produced if preserving facilities were to be erected. This industry would tend to curtail imports of these items and conserve exchange.

Corn tomatoes, peas, beans, onions

Vegetables — Canning of shelled corn, tomatoes, peas, and beans together with dehydration of onions and other vegetables has not been entered into on any commercial scale. The fresh produce is usually marketed quickly, as canned goods in this class are not too popular in the average home. However, considerable imported inventories are noticeable in the local shops, which gives rise to the conjecture whether this phase of food preservation could not profitably be invested in. Careful market studies appear to be advisable.

Beef, mutton, pork, short in supply

Meats — With the exception of the initial operation in beef packing at Guagua, no other activity was reported. Doubt exists that this industry will attract venture-capital when surveying livestock sources in the Philippines. Beef, mutton and pork are in short supply and a decade or more will be required to replenish war devastated stocks in order to provide ample supplies. With the fact that corned beef and mutton were successfully packed, long range planning points toward the slow development of this business.

Future Probabilities — Reports submitted show that wild olives and figs abound in certain areas throughout Luzon. Peanuts, cashews, and other nuts can be and are grown successfully. Peanuts would provide for a small oil and butter industry. Attention is called to the high nutritional value of peanut butter, also of crop diversification in upland rice and corn areas.

"Fancy grocery shops"

Generally, the export market possibilities for preserved delicacies would find its principal outlets through the so-called "fancy grocery shops" where premium prices are paid for imported unusual foods. That this industry would provide a new medium of dollar income cannot be overlooked and private capital should be encouraged to enter the field. It is also pointed out that extensive studies are being conducted on coconut food products and experiments are now taking place on nipa palm sap as a soft drink containing exceptional food value. Chicos and lanzones also warrant attention from an export angle. Recent thought has been given to transporting fruits and vegetables in deep-freeze units but these schemes should be acted upon with care and sound judgment.

Rice and Corn Milling

Large investment before war

This industry represented a fairly large investment during pre-war years totalling some ₱30,000,000. The value of production amounted to approximately ₱60,000,000. With the present Government plans for increasing rice and corn production, particularly in the dry upland areas, the expanded production will require additional milling facilities over those which existed. The capital requirements for this expansion may well total over ₱20,000,000. This investment, undoubtedly, will be borne by private capital.

Vegetable Oil

Pre-war imports of hydrogenated vegetable oils averaged 800 tons annually, valued at approximately ₱150,000. These oils were mainly derived from the processing of peanuts, soya, corn and cotton seed.

Inasmuch as hydrogenated vegetable oils are a necessary ingredient in the manufacture of food products it would appear that, if possible, an effort toward self-sufficiency in this field would be desirable. Although average yearly imports are at the present time relatively small, the progressive educational program and the anticipated desire for a higher standard of living occasioned by the industrialization program will no doubt considerably increase demands.

Must be emphasized and expanded

Investigation reveals that vegetable oils suitable for hydrogenation are not produced in this country. Inasmuch as the primary products from which these oils can be produced are soya plants and peanuts, the cultivation of these crops must be emphasized and expanded.

The production of the proper raw materials will require some time. Dependent upon the volume of production, plans should be prepared for the establishment of suitable processing units. It is felt that a small pilot plant should be initially installed whereby experimentation may be carried on and reasonable production assured. An initial investment of ₱400,000 is believed sufficient.

Coconut Products

Important export of Philippines

One of the most important exports of the Philippines is coconut in the form of copra, desiccated coconut, and coconut oil. Despite the fact that the Philippines is rated as being the largest producer of copra, the quality of this product is considered to be the poorest level. Prices paid for Philippine copra are very much lower than those paid in any other producing country.

However, the Philippine coconut products industry gives promise of early complete recovery. Already the production and export of copra have surpassed pre-war volume by about 100 per cent, and exports are expected to maintain or exceed the present 600,000-ton level for the next several years. With world-wide demand at high prices, copra has been a major factor in Philippine recovery. Production of coconut oil in 1946 was about 80,000 tons, of which 50,000 were consumed locally. This was about one-third of pre-war capacity, and about 40 per cent of pre-war output.

Philippine copra production increases in 1947 have placed the new Republic toward the forefront of world fats and oils exporting nations.

P.I. one of few countries able to boost production

The Philippines was one of the only countries which was able to boost its 1947 production substantially over 1946, the International Emergency Food Council announced in its final allocations for distribution of 3,474,000 metric tons of fats and oils among 60 hungry nations.

An IEFC announcement said "the output in and the exports from some areas of South America, Asia and the Pacific and African colonial territories, though bettering totals in 1946, have fallen far below expectations at the beginning of the year. However, this has been more than counterbalanced as far as export supplies are concerned by heavier output of whale oil, Philippine copra and general fats and oils production in the United States."

The Philippines, while a premier exporter of fats and oils, also imports these products in certain finished forms. Among the supplemental allocations announced by the Department of Agriculture from American production was a total of 300,000 pounds of train screenings oil. This will be exchanged for an equivalent amount of copra.

Production of copra cake and vegetable lard, by-products of the oil industry, fell off proportionally. Many of the coconut oil refining plants destroyed during the war are being rebuilt, and some new plants are under construction. To regain pre-war export levels and supply domestic requirements a production capacity of 240,000 tons of coconut oil would be required. How soon this can be reached will depend largely on the rate of delivery of needed machinery and equipment.

Recovery has been extremely rapid

In the desiccated coconut industry recovery has been very rapid, and the pre-war production level of 32,000 tons should be reached this year. Plans have been made and equipment ordered to increase production to 63,000 tons by 1949.

Like rice, some coconuts are grown in every province in the Philippines, and it appears paradoxical that except in the preparation of beverages from coconut waters, native consumption of the nuts as food was much less per capita in the Philippines than in most tropical areas before the war. This lack of interest in a food product ready at hand may be attributed in part to more extensive use of coconuts in the production of copra for sale to oil mills and exporters and in part to the fact that under free-trade relations with the United States larger quantities of foodstuffs per capita were imported than is usual in tropical islands.

Brazilian palm may prove real threat

Coconut oil is one of the major ingredients used in the manufacture of toilet soap. However, coconut oil was threatened before the war by a promising competitor, the babassu oil extracted from a palm which grows wild in Brazil. If this Brazilian palm can be scientifically cultivated, a very real threat will be offered the coconut oil industry.

In order that the industry may insure itself against possible collapse, the following steps are considered to be of vital necessity:

1. That a scientific method of copra-making (drying) be developed.

2. That a new process of oil extraction be introduced, which may give rise to by-products of commercial value. The most recent studies have disclosed that the direct-to-the-meat method has no appreciable advantages over the method of drying the meat in rotary driers to moisture content of 3.5 per cent and directly extracting the oil from the dry meat. This is the procedure at present followed in copra centrals as outlined in the program of industrialization.

Mass production on cheap scale is necessary

It is believed that only by cheap mass production can the coconut oil industry adequately meet world competition. Considering the two points stated above, therefore, it would seem that intensive research should be undertaken immediately. In this respect, the following points should be considered:

1. The possibility of building an efficient copra drier at a cost that will make it available to the average producer.
2. The extensive study of the Lava process in its pilot plant stage in order to ascertain its commercial feasibility.
3. The investigation of the possible uses of coco oil as fuels for power generation.
4. The determination of possible commercial uses of all parts of the coconut tree.
5. The extensive survey of the possible and appropriate means of increasing the amount of coconut oil in the average Filipino diet.

Comprehensive study of coconut industry is warranted

The present international position of the coconut industry warrants comprehensive study. It is suggested that negotiations be started with U. S. government to change the "preferential trade" portion of the Bell Trade Act referring to coconut oil. It would be desirable if this product were one of the export products of the

Philippines which would be able to enter the American market tax free.

Erection of big oil mills not recommended

However, although the United States Trade Agreement gives the right of allocation of coconut-oil exportable to America to pre-war companies, and any of these companies who care to reconstruct their oil mills here have the right to do so, the erection of big oil mills which will perpetuate the present method of making "tapahan" copra is definitely not recommended.

President Roxas has been asked to allocate to coconut growers all the oil quotas that are still unassigned or that have been abandoned by former assignees.

4 oil-processing plants of 70-ton capacity

It is recommended that four oil-processing plants of 70-ton per day capacity be established. These may be located in any of the coconut producing provinces of the country. A rough estimate indicates that at least ₱3,000,000 would be needed for this project. The present price of coconut oil assures a minimum 15 per cent annual return on the capital investment.

World demand for copra is tremendous

Pre-war exports of the Philippines averages approximately 500,000 tons annually. In 1946, the export was nearly that of pre-war times and for the year 1947 it is expected to reach approximately 700,000 tons. The world demand for copra is tremendous and it is believed that in view of the present world conditions the Philippines has better political and economic capabilities than most other coconut-producing countries in Asia. It is recommended that copra production be increased to the maximum to take advantage of world demand.

The National Coconut Corporation has decided to erect a plant for the manufacture of wallboard from coconut husks. Later studies will be conducted to make paper pulp from the husks and the leaves of the coconut tree.

Coconut Coir

Over million pounds go up in smoke every year

It is estimated that over 1,000,000 pounds of coconut coir go up in smoke each year in the Philippines, as this useful residue is burnt without any thought being given to the uses to which it could be put. It is considered that a small profitable business could be set up for the utilization of this surplus fiber for the manufacture of such essential items as insulation, mats and bags. This could very well provide the introduction of new industries based on utilization of waste in the Philippines.

Tobacco

Prior to the war, tobacco was the chief source of direct revenue to the Government. It ranked fourth on the export list and first as an employer of labor.

Philippines was big producer of tobacco products

In 1940, the Philippines imported from the tobacco growing countries of the world approximately 1,198,000 kgs. of raw tobacco products in the form of leaves, stems and scraps valued at ₱1,058,707 and manufactured products such as cigars, cigarettes, chewing and smoking tobacco, valued at ₱13,695,891. Exports of all types of tobacco products, manufactured and raw, totalled ₱10,292,061 for the same period. Obviously the Philippines is a considerable producer, as well as consumer, of tobacco products.

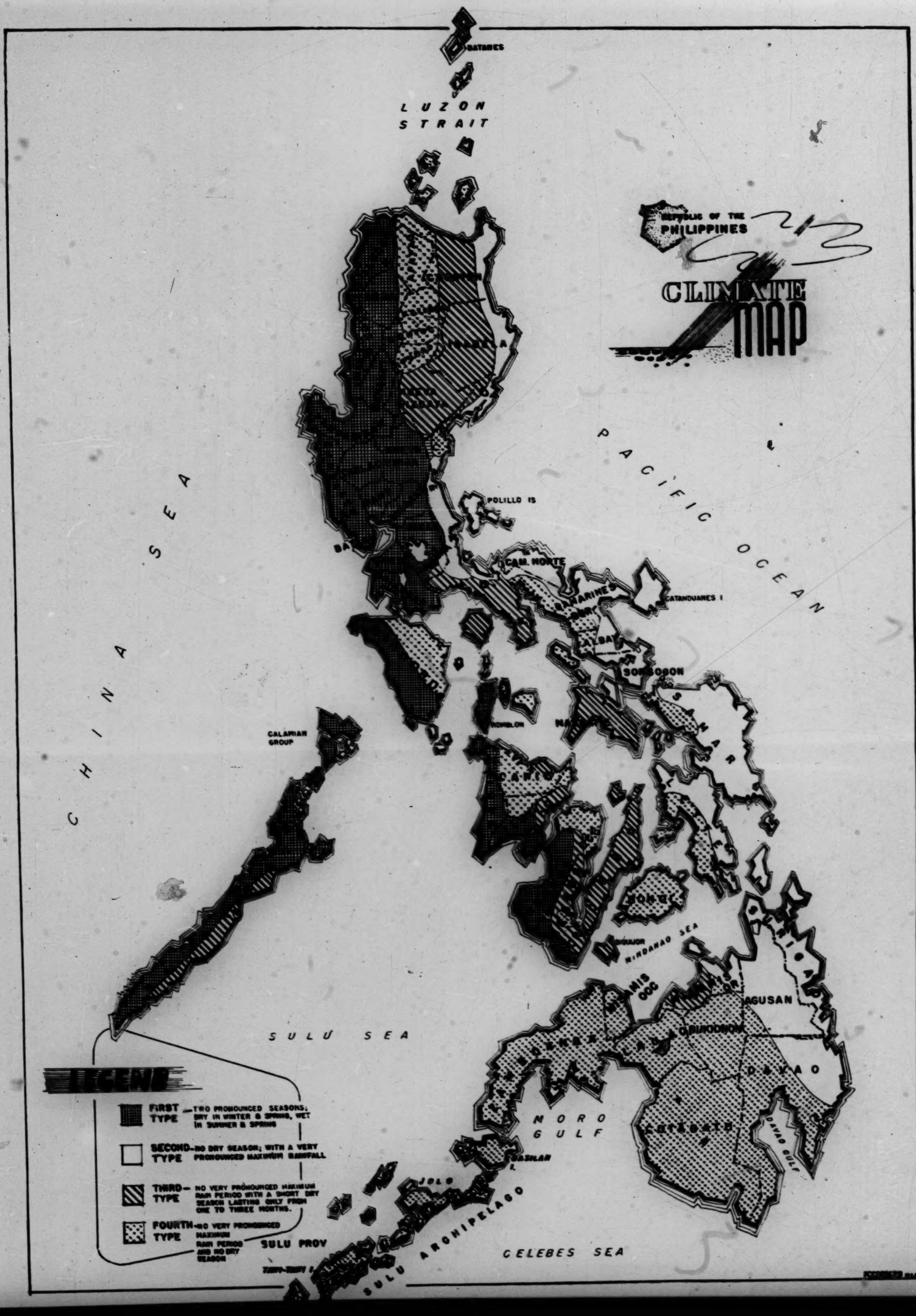
Pre-war tobacco factories were valued at approximately ₱10,000,000, excluding lands and plantation buildings. War damages have been estimated at 60 per cent of pre-war production, indicating that approximately ₱6,000,000 will be required for the rehabilitation of the industry.

In recent years, the number of factories increased from 23 to 46 but the number of personnel employed decreased from 6,200 to 3,200 and production decreased 85 per cent on cigars and 60 per cent on cigarettes. At the same time production costs, including material, labor and transportation, have risen to the point where these factors, plus unfavorable foreign exchange, have caused low priced cigar prices to advance approximately 300 per cent and the higher priced cigars and cigarettes to advance 100 per cent and 180 per cent, respectively. Dutch products on the other hand, undersell local products by as much as 30 per cent. Measures must be adopted to protect and assist the tobacco industry and it would appear that these measures should be directed as follows:

1. Immediate financial aid
2. Increased production
3. Decreased production costs
4. Improvement of products
5. Standardization of products
6. Licensing and control of factories
7. Increased efficiency of marketing procedures

Immediate aid is necessary

Immediate financial aid should be made available either by the more prompt payment of war damages or by direct Government or financial institution assistance.

REPUBLIC OF THE PHILIPPINES
CLIMATE MAP
BATANES
LUZON STRAIT
PACIFIC OCEAN
CHINA SEA
POLILLO IS
CAM. NORTE
CAMARINES SUR
CATANDUANES I
ALBAY
SORSOGON
SAMAR
MASBATE
ROMBLON
CALAMIAN GROUP
CAPIZ
BOHOL
SIQUIJOR
MINDANAO SEA
MISAMIS OCC
SURIGAO
AGUSAN
BUKIDNON
LANAO
ZAMBOANGA
DAVAO
DAVAO GULF
COTABATO
MORO GULF
BASILAN I.
JOLO
SULU ARCHIPELAGO
SULU PROV
SULU SEA
CELEBES SEA
LEGEND
FIRST TYPE — TWO PRONOUNCED SEASONS; DRY IN WINTER & SPRING, WET IN SUMMER & SPRING
SECOND TYPE — NO DRY SEASON; WITH A VERY PRONOUNCED MAXIMUM RAINFALL
THIRD TYPE — NO VERY PRONOUNCED MAXIMUM RAIN PERIOD WITH A SHORT DRY SEASON LASTING ONLY FROM ONE TO THREE MONTHS.
FOURTH TYPE — NO VERY PRONOUNCED MAXIMUM RAIN PERIOD AND NO DRY SEASON

A committee was organized in December 1945 for rehabilitation of the Philippine tobacco industry. Its members—planters, manufacturers, and exporters of tobacco products—estimated the 1945-46 tobacco crop, harvested in March and April 1946, at 27,885,000 pounds, or about 40 per cent of the pre-war average commercial crop. Planting during August and September 1945 was impeded by the menace of Japanese troops. The loss of most animals in the Cagayan Valley, as well as destruction of curing barns, warehouses, and implements, also interferred with planting, while a shortage of seeds and inadequate supplies of labor presented further difficulties. It was the hope of the industry that conditions would be sufficiently settled by August 1946 to permit the planting of approximately a full crop for harvest in 1947.

Early estimates revised in 1946

Early estimates of tobacco stocks in the Islands were substantially revised in 1946 and trade sources indicated that supplies were in the neighbourhood of 26,000,000 pounds, much of which was from the large crop of 1940-41, and considered of very good quality. Recent reports from the trade reveal that small shipments of Philippine leaf tobacco have been made to Shanghai by Chinese dealers and that negotiations are under way for export to Spain of about 1,000,000 pounds. Although profits from exporting are considered small, dealers are hopeful of re-establishing pre-war business.

Immediate financial aid should be made available either by the more prompt payment of war damages or by direct Government financial institution assistance.

Marked increases in production may be expected

Marked increases in production may be expected only by the comprehensive mechanization and modernization of vital phases of manufacturing operations. Dependent, of course, on the availability of finances, this mechanization should be undertaken immediately. Citing the experience of Cuba, in which country mechanization need not necessarily reduce the amount of labor needed for an industry providing such industry is capable of expansion.

Decreased production costs as well as the above-mentioned increased production will be realized by the introduction of comprehensive mechanization. These costs may also enable manufacturers to permit greater profits to be realized by growers, who have generally been hard pressed. Recent concentrated efforts to eliminate the numerous middlemen between the growers and manufacturers has resulted in increases to the growers of 100 to 200 per cent.

While mechanization will undoubtedly tend toward a general improvement of products, the optimum improvement and standardization may probably be only achieved by legislative action requiring the licensing of factories and the rigid inspection and supervisional control of raw materials, handling, grading, sorting, curing, aging and manufacturing. In order to implement this phase of the operation, the industry should be urged and assisted to purchase stripping and rolling machines, now in general use in the majority of large tobacco producing countries other than the Philippines, and Government facilities, where necessary, should be made available to members of the industry at a nominal fee. In this manner modernization and mechanization, while being urged on the industry, may be provided where purchase by the industry for economic reasons is not possible or feasible. The advantage of using Government facilities at nominal cost should also eliminate the majority of the factories now producing inferior products. The Government can and must maintain high standards for Philippine products not only to urge local consumption of local products but to insure widespread acceptance of these products in the world markets.

Modernization and mechanization

Increased efficiency of marketing procedures may probably be obtained by the further elimination of middlemen, particularly through cooperative buying and selling organizations formed by the members of the industry, and the establishment of offices in the United States for the widespread distribution of Philippine products. This latter project has been discussed elsewhere in this report and was certified and approved in the year 1945, after having been under consideration for some time prior to the outbreak of the war. It is highly recommended that this project be adopted at least in combination with the Philippine Purchasing Commission, the National Development Company or some other Philippine entity represented in the United States.

Elimination of middlemen is necessary

The more apparent of the problems of the tobacco industry have been enumerated and suggestions offered. Until such time as cooperative movements demonstrate the ability of the industry to sustain itself and to adopt voluntarily measures for its progress, the Government must necessarily control, supervise, direct, educate, support and lead the industry, for its own, as well as the Govern-

Govt. must direct, educate, support tobacco industry ment's protection.

Abaca

Abaca and its products, particularly ropes and cordage have made Manila and the Philippines famous throughout the world.

Made Manila famous

For generations the Philippines have held a virtual monopoly in the production of abaca. Pre-war exports of the fiber were valued at ₱24,000,000 per year, and cordage exports at ₱3,6000,000. Despite destruction of one rope factory, present production of cordage by the remaining two plants is expected nearly to equal pre-war output this year.

Production of abaca in 1947 will be about one-third the pre-war volume, owing to the damage chiefly to plantations in Davao Province, Mindanao. It is probable that production and, correspondingly, export will fall even lower during the next two years because of overstripping and planting to other crops. If prices are favorable, production should increase thereafter.

Experimentation in the cultivation of ramie has been in progress in the Philippines for some time. Conditions are favorable, and six crops a year have been produced. If present experiments in degumming by the use of micro-organisms, as developed in the Islands, are successful in full-scale operation, ramie should have an important future in Philippine fiber production.

Ramie should have important future

The abaca industry represents a capital investment of approximately ₱100,000,000, of which war damage to plants and facilities is estimated at 30 per cent. However, as compared to the annual production of 1,500,000 bales immediately prior to the war, the crop for the year 1947 is expected to approximate 650,000 bales.

Prior to the war, revenues on these products in the form of taxes, excluding indirect exports taxes, represented nearly 4 per cent of all government revenue and in view of advanced prices may be expected to exceed that amount during the current year. However, although abaca prices are approximately double those of prewar, this advance is not comparable to that recorded by other world commodities. A further deterrent factor is that an unfavorable dollar balance exists throughout the world. Foreign buyers, with the exception of the United States, are in poor position to pay for their purchases and some barter arrangements may be necessary.

At the present time the bulk of Philippine abaca is entering the American market. The United States Reconstruction Finance Commission last year negotiated a one year contract with the

Bulk of abaca going to U. S.

Philippines in order to insure the United States a substantial share of the Philippine abaca crop. This contract provided the Philippines a much needed source of income and definitely encouraged production. No restriction is placed upon the quantity of raw fibre to be admitted to the United States but very definite restrictions limit the amount of cordage which may be entered. For this reason the three large local firms engaged in the manufacture of cordage will proportionately divide the American quota and any further capitalization for cordage manufacture may probably be not expected due to the restrictive quota.

Much needed source of income

Not confined to war damage

The problems with which the abaca industry is faced are not confined to war damages, foreign markets and world economic conditions. In addition to the fact that land planted with abaca loses its productivity rather rapidly and is considered worthless for further production in 28 years, thereby requiring constant crop rotation, the plant is prone to certain plant diseases and insect menace. Short unit production at the present may be attributed to overstripping, failure to fertilize and failure to rotate, and overall production to lack of adequate transportation facilities and the fact that much land formerly held by pre-war Japanese occupants has not been disposed of and is not producing.

It would appear that unless cooperative movements for the protection and expansion of the industry develop, the Government must necessarily direct, supervise and exercise control for the industry's own protection. Immediate recommendations are as follows:

Four immediate recommendations

1. That the Government establish an equitable basis for the disposal of pre-war Japanese-controlled lands and that this distribution be expedited in order that production may be assured.
2. That the vital transportation facilities be restored to the large abaca producing sections without delay.
3. That the Department of Agriculture be empowered to issue long term contracts to planters.
4. That effort be made to properly control marketing procedures to insure more broad market coverage and to prevent monopolistic practices.

Industry is in fair condition

In summary it may be said that the abaca industry is in fair condition but much can be done that will be of immediate assistance. The importance of the industry as a source of Government revenue and as a basic factor in the economic welfare of the country must not be overlooked.

Ramie Industry

Ramie (Rhea) belongs to the nettle family of Urtica, subdivision Boehmeria nivea and Boehmeria tenacissima. It is known as "China Grass", and is grown in China, India, Formosa, Java, Sumatra, Borneo, Malacca and Mexico. There are many varieties that are grown in the Philippine Islands. Of these varieties Saikeseisin which has the commercial importance, excels Guiran Taipan No. 1, Guiran Taipan No. 2, Taiwan Hakuchi, Taichu and Chuma.

"China Grass"

Ramie is a perennial, subtropical plant and requires almost no cultivation after the first year. In Mindanao, ramie is cultivated extensively and grows from nine to twelve feet high. The most reliable report on ramie growing is the published article of Mr. F. D. Luistro, Agronomist of the Bureau of Plant Industry. His estimates of expenses at Aroman, Cotabato, place the cost of labor and materials from April 1940, to September 1941, at ₱125.35 total expenses per hectare. This estimate was based on the expenses of 50 hectares plantation.

Grows from nine to twelve feet high in Mindanao

Luistro reported a yield of 9.79 piculs or 1,362 pounds of fibre per hectare on the third cutting, (June 1 to July 12, 1941) which was estimated from the nine hectares plantation. He reported further that the operating cost of harvesting ramie (third cutting) was ₱132.27 per hectare. The selling price of ramie before the war was ₱48 per picul, F. O. B. experiment station. Since the cost of production is ₱13.50 per picul, the net income per picul (third cutting) is ₱34.50 or ₱0.55 per pound.

Prewar price

According to Manufacturers Record of January, 1946, page 126, one acre of ramie plantation in the United States is capable of yielding 1,500 pounds of ramie fibre. Degummed ramie was sold at 80 centavos a pound before the war and under the pressure of war demands, mills have paid up to ₱1.20 a pound.

According to an Associated Press dispatch published in the Philippine Liberty News on April 17, 1947, China produced 20,000 tons of fibre just before the war. In 1936, the Japanese processed 40.000,000 pounds using the fibre for sail-cloth, fishing nets, and other marine uses. Hamilton Wright, Sr., reported in the Manufacturers Record of August 1946, page 58, that the Philippines produced 2,500,000 pounds of ramie fibre in the first eight months of 1939. The United States took one-fourth and Britain, three-fourths of the production. Evaluating the eight months production at ₱1 per pound, the total value would be ₱2,500,000. A net profit of ₱250,000 could be realized at 10 centavos per pound.

Britain took major portion

Difficult problem in development

The difficult problem in the development of ramie industry is the separation of the fibre from the plant stalk. It would be more economical if the harvesting, sorting and decortication could be done mechanically on a commercial scale. Preliminary studies indicate that the epidermis of the ramie stalks should be removed and treated before decortication, or this stage must be done while the stalks are freshly harvested. This step is the pre-treatment before the degumming process to facilitate the removal of the gums and pectins. There are two or three efficient agents of degumming which have given effective results. Enzymes (pectinase) or other micro-organisms may take the place of caustic and corrosive chemicals in the process of degumming. The present process of degumming is already feasible, but more extensive experiments are recommended. However, research still continues for another effective degumming agent. In the process of degumming, the preservation of the tensile strength of the fibre is essential.

Reportedly strongest known in world

Ramie fibre is soft, lustrous, silky and pure white. Its prominent characteristic is its extraordinary strength. Ramie fibre is reportedly the strongest known in the world today. Its tensile strength is about three times that of hemp, more than eight times of cotton, almost eight times that of silk and four times that of flax. It is less elastic than silk but 50 per cent more elastic than flax.

May revolutionize textile industry

During the war ramie was used extensively. These wartime uses must be expanded and further studies undertaken. The annual consumption of the N. D. C. textile mill before the war was 3,666,000 pounds of raw cotton. In this connection, if ramie fibre could substitute for cotton, it would cut down a great part of the cotton importation. The development of the ramie industry in the Philippines may revolutionize the textile industry. A great bulk of the product could be utilized in the manufacture of textiles, fish-nets, and fishing lines and the excess could be exported.

For the textile mills, ramie fibre can be woven into garments and household linens upholstery fabrics, halyards, naval cordage, sail cloth, fire hose and parachute cords and harnesses, auto and truck tires. It can be woven in combination with cotton, linen and wool.

Produce good cattle and poultry meal

In addition to the commercial importance of the fibrous bark, the tops and leaves, which constitute 30 per cent of the green material harvested, may also be utilized. The tops and leaves of the plants, when dehydrated, produce good cattle and poultry meal. The analysis of Philippine ramie shows that it contains commercial protein, 23 per cent; fats, 7 per cent; ash and calcium, 4 per cent. It is an excellent source of vitamin A due to the carotene contents.

In the United States one acre of ramie plantation can produce 3 tons of dehydrated cattle feed, one ton of which has a market value of ₱130.

The gums, pectins, and the woody cortex may have some industrial value.

Recommendations:

Future of ramie definitely promising

Experts in the United States state that the future of ramie is "definitely promising." Hamilton Wright, Sr., reported that an investment of several million dollars had already been placed in lands, pumping plants, canals, farm machinery and two large processing plants in the Everglades, Palm Beach County, Florida. In view of the foregoing, it is suggested that the following recommendations be immediately considered:

Three immediate recommendations

1. That the Philippine Republic conduct a survey with a view to establishing a ten thousand acre ramie plantation.
2. That the Philippine Republic construct a processing or central plant thereby assuring ramie planters adequate processing facilities.
3. That the Philippine Government purchase ramie machinery of the same type as that used for flax, such as decorticator, degumming equipment, carding, roving, spinning, bleaching, gill boxes, wet ring spinning frame and drying spinning frame, for the purpose of experimentation as well as production. The estimated cost of this complete plant is ₱600,000.

TEXTILES AND ALLIED INDUSTRIES

Textile

THIS BASIC INDUSTRY suffered severe losses as a result of the war. There were four textile mills, together with some 200 units of home weavers, in operation prior to the war, with a total annual production of 24,280,000 yards. Three of these mills were totally destroyed.

The misuse of the National Development Company Textile Mills alone caused damages of approximately ₱6,526,400. Inasmuch as textiles, particularly clothing, are among the prime commodities, prices and supplies should remain in steady channels. Recent fluctuation of the textile market in the Philippines have been caused by a series of factors as follows:

1. The recent signing of an agreement between United States Commodity Corporation and the Philippines for approximately 13,000,000 yards of Japanese cloth.
2. Large inventories held by retail merchants.
3. Excessive imports over an extended period of time.

During the latter part of 1946, the average price of the common variety of textiles had risen approximately 350 per cent above that existing in the year 1940. The large amount of cotton goods imported in 1940 (₱34,000,000) placed this commodity second in direct imports. By 1955 it is estimated that the national demand for cotton goods will approximate 100,000,000 yards of cloth and 83,000,000 pounds of yarn. To satisfy this demand, 300,000 new spindles and 6,000 looms will be necessary. By supplying textile requirements domestically, price changes in foreign markets will have a minimum effect on Philippine textile economy.

Raw Materials

Cotton should be grown in P. I.

The annual demand for raw cotton will be in excess of 80 million pounds. This cotton should be grown in the Philippines in order to supply the bulk of this requirement. However, since this quantity could not be grown immediately in the country, it would provide an excellent import from the United States. Inasmuch as cotton is one of America's chief export commodities, this would provide excellent material for further revisions of the tariff act and may develop other trade advantages.

Development of ramie industry

With the development of the ramie industry, it is felt that the progress of the textile industry may be even more important, ramie being considered to have tremendous advantage over any other known spinning material. Inasmuch as the islands have been proven extremely adaptable to the growth of this product, early expansion of the spinning and weaving facilities will insure ample productive capacity.

Secondary Industries

Once the textile industry reaches peak production, the ample supply of textile materials at reasonable cost will no doubt make the mass production of finished textile products entirely feasible, providing, thereby, numerous secondary textile industries. An immediate industry to which attention should be given is the fish twine and net manufacturing industry. This industry is discussed on the following pages.

Mass production of textiles is entirely feasible

The year 1953 has been chosen as the basic year in which the Philippine textile production can be brought into balance with national demand. This projection should provide sufficient time in which the new plants may reach maximum operating efficiency.

It is recommended that the existing Japanese mill comprising of 17,000 spindles and approximately 375 looms be immediately reerected in the Ilocos or Iloilo regions in order to supply the much needed yarn and cloth to the weaving industry in those areas. It is estimated that weaving yarns which are now being produced by the N. D. C. Textile Mills are sold to the local weavers at a price range of ₱4.50 to ₱4.75 net per kilo. These prices are competitive with yarns imported from the United States. This installation would also necessitate a small steam power plant of 1,000 KW capacity in order to provide the necessary power to the installation. The total estimated cost for re-erecting the plant is ₱1,400,000.

Would necessitate small steam power plant here

In addition to the above recommendation, an additional five plants in units of 50,000 spindles each should be installed over a period of eight years, as it is believed that this size of plant is optimum for the Philippines.

It is estimated that a capital requirement of ₱40,000,000 will be required for the erection of these proposed plants.

Fish Twine and Net

The establishment of a fish twine and net manufacturing industry, in addition to being a sound financial venture, would be of great assistance in rehabilitating and expanding the fishing industry. The fishing industry is being severely hampered by the high cost and short supply of these very vital items.

Sound financial venture

It is estimated that the annual requirements of the Philippines are 12,000,000 lineal feet of 100 mesh netting and 35,000 lbs. of netting twine. Prior to the war, all of these supplies were imported, mostly from Japan. Considering the world shortage and the inability of most manufacturers, including American, to produce, the production situation appears critical and will remain so for sometime to come.

Situation is still critical

A detailed financial and economic study reveals that the establishment of a fish net and twine manufacturing industry will accelerate the task of rehabilitating and expanding the fishing industry by producing these vital materials in adequate quantity at less than one sixth the current price, will utilize sizeable amounts of native raw materials, become a welcome adjunct to the present N.D.C. textile industry, free the Philippines from dependence on a foreign source of supply, and enable the Republic to seek and develop an export market and provide gainful and productive employment for a large number of people.

Welcome adjunct

Financial Investigation

Inasmuch as the primary motive in the establishment of this industry is to provide vital materials at low cost, the sales price has been established so as to provide a net return of 10 to 20 per cent on total capital investment. If current prices were used, the percentage return would be 80 to 100 per cent.

Provide vital materials at low cost

The equipment required for the production of fish line and twine is relatively simple. The manufacture of this equipment can easily be accomplished in a moderately equipped machine shop. This practice has been started by many other nations which have their own textile industries as a source of yarn.

Investigations are now proceeding in the United States with regard to the manufacture of fish line and twine equipment for the eventual production of this commodity.

1. *New equipment*		
a. Total Capitalization		₱3,649,994
b. Total yearly operation costs		1,372,494
c. Estimated yield:		
Gross sales	₱1,737,494	
less operating costs	1,372,494	365,000

or 10.0% yield on capital investment.

Knitting Industry

Prior to the war this industry consisted mainly of small shops, the majority of which were destroyed. Recent information reveals that several private operators have lately placed orders for new equipment with the intention of reviving the knitting industry.

It is known that the National Development Company also has plans for installing a number of units, but the exact production figures have not as yet been established.

It is estimated that the 1947-48 consumption, based on 1940 values, will be as follows:

Drawers	₱ 89,694
Jackets and other outer-wear	610,230
Socks and Stockings	448,587
Sweaters	82,397
Undershirts	1,834,529
Other knitted goods	40,297
	₱3,105,734

A survey of the pre-war knitting situation reveals that the Japanese built very satisfactory units. A large quantity of knitting machines were imported to the Philippines from Japan bearing the label "KM.S.", manufactured in Osaka. It is reported that a Tokyo firm, the Waco Seizo Kogyo, is now manufacturing some units for domestic use.

Enquiries have been made for the National Development Company regarding:

a. Knitting machines for undershirts
  Diameter 7" to 36"
  Gauge 6" to 24"
  Quantity — 50
b. Knitting machines for socks
  Quantity — 50

The acquisition of this machinery is being sought on a barter or open account basis.

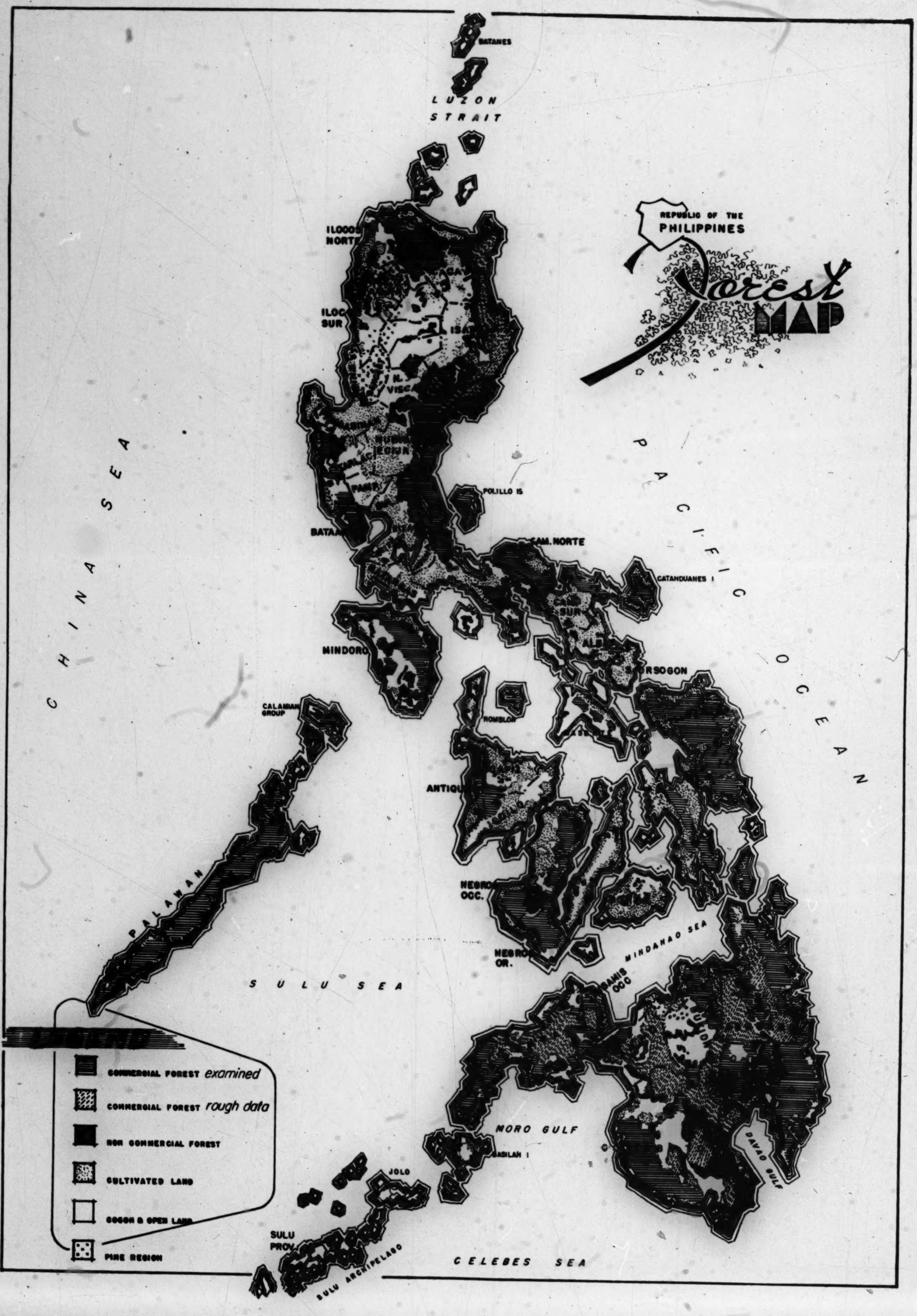
In view of the heavy demands for this type of cotton goods, it is recommended that private industry and home weavers should be given every assistance and this industry be built up, rather than that the nation should continue to rely on imports.

In addition to actual knitting units, machines for cutting patterns, binding, hemming, labelling, should be acquired.

Minor Knitting and Weaving Industries

Buri palm, abaca waste if cottonized, and many other Philippine fibers are suitable for weaving purposes.

Buri palm in particular provides an excellent substitute for burlap. Experiments in the United States indicate that, this material, when plasticized, offers a good market for car door linings and for furniture covers.


REPUBLIC OF THE PHILIPPINES
Forest MAP
BATANES
LUZON STRAIT
ILOCOS NORTE
ILOCOS SUR
N. VISC
BATAAN
POLILLO IS
CAM. NORTE
CATANDUANES I
CAM. SUR
SORSOGON
MINDORO
CALAMIAN GROUP
ROMBLON
ANTIQUE
NEGROS OCC.
NEGROS OR.
MINDANAO SEA
MISAMIS OCC
MORO GULF
BASILAN I
DAVAO GULF
JOLO
SULU PROV.
SULU ARCHIPELAGO
CELEBES SEA
SULU SEA
PALAWAN
CHINA SEA
PACIFIC OCEAN
▤ COMMERCIAL FOREST examined
▨ COMMERCIAL FOREST rough data
■ NON COMMERCIAL FOREST
▩ CULTIVATED LAND
□ COGON & OPEN LAND
⁙ PINE REGION

FOREST PRODUCTS

THE PHILIPPINE ISLANDS, it is claimed, once were entirely covered with forest growth, from the plains at sea level to the highest mountain tops. Today, public forest areas comprise more than 43,000,000 acres, or nearly 60 per cent of the total land area. In 1939 the Philippine Bureau of Forestry estimated the volume of standing commercial timber at 464,740,000,000 board feet, with an approximate value of ₱8,000,000,000.

At the beginning of American occupation this store of wealth seems to have been little appreciated; forest operations were limited, and the total number of tree species which had been identified was about 1,200. Some 3,000 species of trees which attain a diameter of one foot or more are recorded at present.

Great range of wood for variety of special uses

In few countries of equal size do commercial woods offer a wider range of color, grain, hardness, and other qualities required for special uses. From the tropical Philippine forest come woods so hard that they are impervious to attack by white ants, together with softer woods which are excellent for cabinet work and inside finishing.

"Philippine Mahogany"

The more extensive forest areas naturally are in the less populated and under-developed regions of Mindanao, Palawan, and other islands south of Luzon. The mountainous provinces of Luzon, however, yield important quantities of timber. In the north, Mountain Province is noted for its pines, while in Camarines Norte and Sur in southern Luzon are heavy stands of red and white lauan, the "Philippine mahogany" of commerce.

Luzon as a whole accounted for 38 per cent of the timber cut in 1938, while 45 per cent of sawed lumber came from mills in this northern island. Cavite was the only province which did not report timber cut in 1938, and La Union and Abra, with Cavite, were the only provinces not showing some lumber output. The greatest number of sawmills were in Mountain Province, Tayabas, the Camarines, Nueva Ecija, and Bataan.

In the mining districts of Mountain Province and southern Luzon considerable logging and sawmilling was carried on by mining companies, which produced lumber and timber primarily for their own use. One of two plywood and veneer factories in the Islands before the war was located in Tayabas Province, the other being in Mindanao. Both factories were Japanese-owned and operated.

Philippine forests have been referred to as "money in the bank", from which Filipino may draw interest while the principal remains intact. Unfortunately a policy of wise conservation has not always existed. In the past much forest area was cleared for small farming plots and the land planted in quick-growing crops. Such clearings were generally soon forsaken for new and greener pastures and the land abandoned to jungle growth of cogon grass and weeds.

No idea of conservation in the past

In time, unlicensed clearing of forest lands was forbidden by law, but it was not until the latter years of the Commonwealth regime that appreciable progress was made toward forest conservation. During the three or four years before the war a number of reforestation projects were inaugurated, some of the more important being in the provinces of northern and southern Luzon.

From 75 to 80 per cent of the pre-war timber production was utilized locally. Export trade consisted mainly of shipments to the United States of the better-quality cabinet woods and of logs to Japan. Other lumber markets were the United Kingdom, China, Australia, and South Africa.

Main export trade was to America

Pre-war production

Pre-war production of lumber and timber was about 1,000,000,000 board feet per year, while exports were about 190,000,000 board feet. The sawmilling industry maintained a capacity of 1,500,000 board feet of raw lumber per day. Despite very severe destruction of sawmills during the war, postwar production has already reached 1,000,000 board feet per day from approximately 200 mills.

Postwar production

Philippine requirements of lumber for reconstruction alone have been estimated at 4,500,000,000 board feet, and it is proposed to bring the annual production of lumber and timber up to 2,000,000,000 board feet as rapidly as possible. This would not only relieve the heavy demand for reconstruction but should lead to a desirable and profitable export trade, particularly in the form of veneers and flitches. To achieve the production rate of 2,000,000,000 board feet annually, the Philippine Bureau of Forestry estimates that an expenditure of ₱50,000,000 would be required—₱22,000,000 for logging equipment and ₱18,000,000 for additional sawmills. The remainder would be used for finishing mills, veneer mills, and dry-kiln and wood-preservation plants.

Timber Resources

The timber resources of the Philippines consist of 13,198,406 hectares of commercial forests covering almost one-half (44.5) of the area of the Islands. These forest areas are estimated to contain a total volume of about 720 million cubic meters or about 305 billion board feet of standing timber of trees 70 centimeters and above in

Total volume

diameter and about 514 million cubic meters or 218 billion board feet of trees 40 to 70 centimeters in diameter. The timber represented by trees 70 centimeters and above in diameter has little remaining growth, and, therefore, can be now cut. Trees from 40 to 70 centimeters in diameter have a possible yearly growth of 1.5 per cent in volume, or 7,720,000 cubic meters or 3 billion board feet available for cutting. Not all of the remaining commercial forest areas in the Philippines can be profitably exploited by machine operation, however, because of unfavorable locations, distribution, kind or volume of the standing timber and terrain topography. For this reason, it is estimated that only one-tenth of the timber stand can be profitably logged. However, of this 10 per cent there are still available 72 million cubic meters or 30 billion board feet of matured timber and a yearly stand of 772,000 cubic meters or 327 million board feet representing the growth of the young timber.

Only one-tenth can be logged profitably

Timber and Lumber Production

During the fiscal year of 1940-1941, lumber production was 2,220,765 cubic meters or 941,604,449 board feet in logs or timber. Of this amount, 348,836,846 board feet was of sawn lumber. During the year 1946, the reported cut from the public forest was only 559,205 cubic meters, or 237,102,290 board feet, of which the sawn lumber production amounted to 103,161,356 board feet. The number of timber concessions, ordinary timber licenses and sawmills involved and their corresponding production before and after the last war is shown as follows:

	Pre-War	*Post-War*
Timber Concessions	19	19
Ordinary Timber Licenses	1,189	1,755
Sawmills	163	173
Logs in Cubic Meters	2,220,765	559,205
Sawn Lumber in Board Feet	348,836,846	103,161,356

Pre-war and post-war production

Immediately prior to the war the local or domestic consumption in hewn timber and sawn lumber was 754,706,066 board feet, of which an estimated 300 million board feet was millsawn lumber and the remainder hewn or handsawn.

Timber Production

As of February 28, 1947, there were in force 19 timber concessions and 1,755 ordinary timber licenses or a total of 1,774 operating licenses covering a total area of 2,898,917 hectares of commercial forests. The required total minimum cut of these forest areas is 3,453,824 cubic meters per year while the maximum

Required total minimum cut

allowable cut is twice the minimum, or 6,907,648 cubic meters. Production in past years, however, has hardly attained the required minimum cut, especially under the majority of ordinary timber licenses. This is mainly because the licenses do not have the capital and equipment commensurate with the size of area and amount of timber granted.

Of the present number of timber concessions and ordinary timber licenses in force, 1,685 of those operating during the past year produced 351,550 cubic meters of logs during the six most productive months from July to December, 1946, or a monthly average of 58,592 cubic meters.

Lumber Production

As of February 28, 1947, there were 92 sawmills with concessions and 81 sawmills without concessions, or a total of 173 sawmills having a total rated daily capacity of 1,048,550 board feet. The mills with concessions are invariably located within, or close to, their timber or logging areas, while those without concessions are usually located in Manila and in other cities and towns far from the logging areas. The sawmills operating without concessions produce much less than those that have concessions for the reason that the former do not have a generally constant supply of logs.

Located close to logging or timber areas

Of the 92 sawmills with concessions granted for the year 1947, only seventy have been operating continuously since last year and 22 are either new mills or mills that have commenced operation during the year. In order to obtain an accurate estimate of the productivity of these mills, a statement of their actual average monthly production as compared with their rated capacities in board feet is given as follows:

Only 70 operating continuously since 1946

	Monthly Rated Capacity	*Average Monthly Production*
70 Sawmills operating	14,325,000	9,940,034
22 Sawmills not operating ...	2,481,250	———

If the 22 new sawmills could be expected to produce at maximum capacity this year, the 92 sawmills with concessions could then be expected to produce a total of 149,055,408 board feet of sawn lumber for the year 1947 at the rate of 12,421,284 board feet a month. It should be noted, however, that the 70 productive mills with concessions have produced only 73,436,404 board feet during the past year although their rated capacity has been estimated at 119,280,408 board feet for the year. One reason for this is that not all mills produced continuously throughout the year.

Of the 81 sawmills without concessions, 56 produced 27,633,106 board feet of sawn lumber during the year 1946 although their rated yearly capacity was estimated at 123,690,000 board feet. The 81 sawmills without concessions have a total rated capacity of 412,300 board feet or a monthly capacity of 10,307,500 board feet. Although it is hardly possible to expect these mills to produce up to their full capacity for the reasons stated above, the inadequate number and capacities of sawmills with concessions make it reasonable to expect that the mills without concessions will produce at least an equivalent of one-half of their capacity or 61,845,000 board feet, during the year of 1947.

Production figures for 1946 and 1947

In view of the above discussion, it would seem that the total 173 sawmills, with and without concessions, operating under present conditions and with their present facilities, should be expected to produce at most 211,000,000 board feet during the year 1947.

Under ideal conditions, including an adequate supply of logs, the 173 sawmills should produce their total capacity of 325,365,000 board feet a year. However, this production in sawn lumber is still 23 million board feet short of the pre-war sawmill production.

Domestic Consumption

It has been estimated that at least one billion (1,000,000,000) board feet of sawn lumber will be needed each year for the next five years for Philippine reconstruction. The expected production of sawn lumber this year is 325,000,000 board feet. This amount is 23 million board feet short of the pre-war production and 675 million board feet short of domestic requirements. This additional requirement will necessitate a corresponding cut from public forests of approximately 4,000,000 cubic meters of logs. This amount is slightly less than twice the pre-war cuttings.

One billion feet needed each year

In order to produce a sufficient amount of sawn lumber to supply domestic requirements, logging and sawmill machinery of a capacity of 2,250,000 board feet per day, based on one 8-hour shift, is necessary. The estimated acquisition cost of these additional mills installed for production is approximately ₱7,450,000. The estimated cost of the machinery and equipment for the corresponding log production is approximately ₱5,000,000. A total investment of ₱12,450,000 is required, therefore, for the entire operation. It is possible to reduce the cost in the sawmills and at the same time maintain production up to the 675 million board feet requirement by reducing to one-half the required number of mills, but working two 8-hour shifts in all mills. However, the daily capacity of the machinery used in the log production remains the same inasmuch as working two shifts or 16 hours each day in logging operations has not proven advisable.

Capital

A large portion of the present holders of timber licenses do not have the required capital with which to profitably operate the concessions that have been granted them. Although equipment is admittedly in short supply, the lack of capital with which to purchase much needed equipment has resulted in inefficiency of operations with incident low productive capacity. Also, the attempted operation of concessions with insufficient capital has the tendency to force operators to take large, quick profits. This practice, of course, has done much to cause the advance of lumber prices.

Equipment is admittedly in short supply

New Mill in Batangas

A Government-owned finishing mill is now being erected in Barrio Santa Rita, Batangas, with a capacity of 80,000 board feet dry kiln timber per day. The plant also has a sash and door mill which will eventually be expanded into a veneer and furniture manufacturing plant.

It is known that additional matchers and moulders have been purchased by private companies, but the exact extent is not known.

Increased Production

The demand for lumber (both foreign and domestic) is greater now than ever before. This demand cannot be met with present productive facilities. However, inasmuch as present production is far below rated capacity, it is also evident that steps must be taken to increase the productive efficiency of the industry. Increased productive capacity must be considered concurrently. It is believed that both these ends could be accomplished as follows:

Steps must be taken to increase the general efficiency

1. By Government participation in production
2. By extending financial and material aid to present producers
3. By encouraging new producers
4. By permitting controlled export, thereby encouraging increased production, protecting the domestic market, opening the export field and assisting the dollar balance.

The export ban imposed on lumber in 1946 has now been eased to the extent that logs and flitches comprising a quantity equal to 20 per cent of the sawn lumber placed on the local market for the three-month beginning July 15, 1947, may now be exported. This is an important point and should be noted.

Lumber Finishing Facilities

There are approximately 40 planers, matchers and moulders in the Philippines, of which 35 are located in Manila. These planers and matchers in Manila have a monthly capacity of about 4,425,000 board feet or an average of 126,000 board feet per plant.

Assuming that 25 per cent of the lumber produced and consumed locally requires finishing, an estimated 72 additional planers and matchers are needed to process the estimated consumption of 14,000,000 board feet of dressed lumber.

Transportation Requirements

It is estimated that the Philippine lumber industry will require the following additional water transportation facilities:

Required water transportation facilities

12 Lumber boats of 1,500 ton capacity
10 F. S. Type ships
5 L. S. T. — U. S. Navy type
10 L. C. T. — U. S. Navy type
20 L. C. M. — U. S. Navy type
30 S. T. or W. T. tugboat, U. S. Army type
40 Barges, steel — 26' x 80'

It is anticipated that the above listed water transportation equipment will be utilized in carrying lumber and logs from mills to consuming centers and that this equipment will be able to transport 56,000,000 board feet per month. This equipment is in addition to the transportation requirements of the individual mills.

Processing of Waste Products

Sending men to America to study possibilities

The Bureau of Forestry has recommended sending forest products utilization men to the United States to study the possibilities of utilizing waste lumber and to make a detailed study of the various processes. An estimated 48 per cent of all felled timber is represented by branches, edgings, slabs, and sawdust. The larger percentage of this waste is not now utilized in any manner. Full utilization of waste lumber should be made. (A full discussion of this subject will be found in another section of this report.)

Sales of Forest Products

It is recommended that adequate sales outlets be developed for the lumber produced by small operators, particularly when their products are shipped to Manila. A central lumber purchasing agency should be established for the purpose of enabling these small operators to rapidly dispose of their production without excessive demurrage and other charges. This agency could be a subsidiary of the proposed National Merchandising Administration or any other qualified Government organization.

Conclusion

Wide popularity in foreign markets

In view of the world demand for construction lumber and the wide popularity that Philippine lumber enjoys in foreign markets, it is strongly recommended that the Government assist in the rehabilitation and expansion of this industry. The results of such a program would secure for the industry a stable world market and would reduce present prohibitive domestic lumber costs.

Plywood and Veneer

The fine quality of Philippine woods and their abundance encourages the erection and operation of plywood and veneer plants.

Plywood is a term generally applied to three or more layers of veneer glued together without effort being made to match or select the beauty or grain of either side of the outside layers. Veneer plywood is plywood one side of which has been carefully selected, matched and jointed for grain and beauty and is usually made of the more rare species of wood noted for beauty of grain.

Only one practical type of plywood can be used here

Due to the moist humid air of the Philippines, especially during certain seasons of the year, there is but one practical type of plywood which can be manufactured in the archipelago. This is the exterior or water-proof type. All other types have proven unsatisfactory because of loosening of the plies caused by the softening of non-moisture proof glue. The thickness of the plywood may range from ⅛" to 1", thickness of ¼", ⅜", ½", ⅝", and ¾" being most generally used. The overall dimensions are standard at 4' in width and 8' in length.

Essential part of lumber production

The production of plywood is an essential part of lumber production. However, for the production of plywood, only the best of solid, straight logs are selected as they arrive at the sawmill. Inasmuch as these logs are used in lengths up to 10', logs containing two or more lengths are frequently reserved for plywood. The selection of plywood logs at the sawmills does not mean that the plywood plant must also be located at the sawmill.

A total of two plywood plants would meet the present needs of the Islands. It has been suggested that one plant be located in Luzon and one in Mindanao. The recommended capacity for each plant has been established at 75,000 board or square feet each day. or approximately 12,900 sheets of plywood 4' wide and 8' long.

Steam must be available for power

Steam must be available for power, the steaming of logs and the pressing and drying of the plywood. Fitches of veneer and choice veneer may be produced in the same plant by the addition of one special type machine. Using modern equipment and with the plant supplying its own power from wood manufacturing processes, the estimated capitalization necessary of the establishment of a mill of approximately 75,000 sq. ft. capacity per day is as follows:

Gross capital	₱850,000
Production cost	600,000
Net return	119,000

Percentage annual return on initial investment . 14% .

Smaller plants may be erected but are not as efficient in operation and will not yield the return of the larger units. The shipping of plywood presents no problem because of its standard size and light weight.

Shipping presents no problem

Exterior or waterproof plywood is being widely used in Canada and the United States for boat construction. Plywood has greater strength than wood of equal thickness. It has the ability to resist shock and splintering, makes for fewer seams per boat and has a generally smooth surface. The advantages of plywood in boat building are immediately obvious.

It is recommended that one plywood plant of the capacity mentioned herein be purchased without delay and placed in operation in the northern islands area. The other plant may be purchased at a later date and should be located in Mindanao. Other plants should be established as funds and equipment become available for purchase and as the need for such additional plant capacity is determined. (A plan for the rehabilitation of the plant at Polillo Island has been submitted.)

Recommended that one plant be started at once

Pulp and Paper

The total tonnage of all paper imported in 1940 was 65,000 tons. Approximately 7,500 tons per year were produced by two local plants.

Although one of the plants indicated above was destroyed during the Japanese occupation, one additional plant was brought by them to the Philippines so that, for all intents and purposes, the local productive capacity is substantially the same as it was prior to the war.

Substantially same as prewar capacity

Although there are nearly 5000 different kinds of paper, they may be classified into two major classes according to use, namely —(1) *cultural* group, papers used for cultural purposes, such as newsprint, bookpaper and fine paper and (2) *utility* group, papers used for mechanical and physical purposes, such as boards, wrapping and bag papers, rug-backing yarn, paper cans, paper boxes, etc.

Present requirements will be much greater than those of 1940

It is expected that present paper requirements will be much greater than those of 1940. An estimate of 1947 consumption is placed at 75,000 tons, which would raise import requirements beyond pre-war figures, even if the optimistic local production figure is actually produced.

The raw materials required in the manufacture of paper consists of many fibrous materials and a few chemicals. The necessary fibres (bamboo, abaca, buho, abaca waste, cogon, maguey, talahib, rice straw, bagasse, ramie, etc.) are all found in abundant quantities in the Philippines. Their location is fairly general throughout the provinces and thus many other plants could be installed depending only upon power and the availability of required capital. Small, compact plants could be erected at strategic points.

Necessary chemicals imported to P. I. will have to be

The necessary chemicals will have to be imported, as will bleached sulphite pulp, but chemical requirements can be materially reduced after the long-range industrial plan has been complete.

Since much experimental work must still be done, and since past manufacturing experience is very limited, it is recommended that at least one pilot plant be maintained. This plant may continue the experiment regarding the use of native raw materials and provide the technical skill necessary for the erection of at least seven additional plants. This is considered a basic minimum to bring production in line with consumption. Paper is one commodity that the Philippines need not and should not import.

P. I. has no need to import paper

Some fine papers will have to be imported for a few years, for here technical perfection must be obtained. The success or failure of the pilot plant and the number of plants erected will determine this requirement. Profits and progress will also be semi-dependent upon the success of the allied industries and the overall industrial program.

The installation of pulp and paper plants is recommended for the following reasons:

1. To develop and exploit the natural resources of raw fibrous materials which are abundant and inexhaustible by virtue of the favorable climate.

Reason why pulp, paper plants needed

2. To produce pulp which is needed in the future rayon, plastic and explosive industries.

The addition of seven plants to the two now existing would provide employment for approximately 3,000 persons, not including those producing the raw materials. The total capital requirements for seven plants would be about ₱30,000,000 and the net return on this investment is estimated to be 14% per annum.

Paper Bag Industry

Establishment of paper bag plant is essential

The establishment of a local paper bag factory is considered essential as a necessary supplement to the Philippines' most important industries. The sugar, cement, desiccated coconut and the proposed pulp and paper industries are the most noteworthy. The local manufacture of paper bags will prove of definite economic advantage as compared to the present practice of importing the relatively high priced jute bags from India. The advantages are listed as follows:

a. The paper bag is calculated to be 4 to 5 times less expensive than the jute type.

b. The paper bag is a more suitable and appropriate container due to its multiwalled construction and the fact that it can be moisture proofed.

c. Local manufacture will enable the consumer to secure this product at a lower cost than that of imported products.

d. The development of this industry will provide a new and ready market for the proposed pulp and paper factory by absorbing a sizeable portion of the production therefrom in the form of kraft or Manila paper which is required in the manufacture of paper bags.

Estimated Total Required Capital Investment	₱1,820,000
Estimated total Cost of Production	₱2,492,000
Estimated Total Net Yearly Income	
(a) Gross sales: (based on 20,000,00 bags annual production at ₱0.16 per piece	₱3,200,000
(b) Total production cost including Sales & Income Taxes plus Marketing Cost	₱2,656,000
Net Profit	₱ 535,840

More employment

It is estimated that approximately 300 skilled and semi-skilled persons will find employment in this industry.

The production of 20,000,000 bags is estimated to be the minimum quantity necessary to satisfy the requirements of the sugar, cement and coconut industries. To provide sufficient paper bags for other estimated local requirements, an estimated two additional plants will be required.

Wood Distillation and Charcoal

The commercial manufacture of charcoal has not been developed in the Philippines except to the extent necessary to supply the small local demand. The archipelago has several species of wood capable of producing an excellent quality charcoal. The best species of wood is ipil-ipil and a survey made in 1939 indicates that areas of this wood can be recut every seven to 10 years. Ipil-ipil can be grown on lands which are not suitable for agricultural purposes and thus would not interfere with the food production of the country.

Several species of wood for charcoal

In the contemplated production of iron and steel in the Philippines, the production of charcoal becomes a necessity since there is no assurance of coking coal being found in the archipelago.

The development of a wood distillation and charcoal plant will produce (from lands not suited for agriculture) charcoal for the reduction of iron ore, tar for the building and maintenance of hard surfaced roads and how cost creosote for the preservation of wood and the development of other industries such as methanol, acetic acid, etc., all of which utilize wood distillation chemicals in their manufacturing processes.

Big need for charcoal seen

It is estimated that there will be a need for a least 60,000 metric tons of charcoal per year. Since this demand must be met each year, approximately 70,000 hectares of ipil-ipil must be planted to meet the demand. Coconut shell, in addition to ipil-ipil, is a waste product, which can be usefully employed in producing charcoal. This is an important point and is worthy of careful consideration.

Finances required are estimated as follows:

Capital Investement	₱10,000,000
Gross Income	2,400,000
Production Cost	1,800,000

Annual return on capital investment would approximate 6 per cent.

Annual return on investment is low

The annual return on investment is low but it must be remembered that charcoal is the product on which the percentage is based. If the saleable by-products are recovered and sold, an estimated annual return of 10 per cent to 12 per cent on the capital investment may be expected.

Careful planning and efficient forest management will supply charcoal and by-products for pig iron and hard surfaced roads at a very low cost.

Earlier mention has been made of a process of producing coke from non-coking coals that are found in the country. The Chemical Construction Corporation, New York, U.S.A. has suggested that several tons of Philippine coal be shipped to them for experimental work. It has been estimated that a processing plant of 200 metric tons coke daily capacity would require a capitalization of ₱10,000,000. However, should the process of producing coke from local coal be proven successful, then this estimate of capital investment can be lowered.

Experimental work has been suggested

It is recommended that further investigation be made and that a pilot plant, modern in method and design, be installed to secure an initial supply of charcoal and by-products to thus aid the operation of the iron and steel industry, the chemical plants and the other allied industries scheduled for establishment in the Philippines.

Recommended modern plant be installed

An additional charcoal plant for steel mills would require a capital investment of ₱24,000,000 including the cost of the plantations whereon the ipil-ipil would be grown.

Rubber Goods

Prior to the war, the Philippines imported all rubber goods with the exception of shoes, which were produced by three large local factories. However, local rubber shoe production was such that an importation of several hundred thousand pairs was required annually. Imports of rubber products amounted to approximately ₱8,000,000 annually, despite two small rubber product factories, now 100 per cent destroyed.

All of the operators of the rubber shoe factories have been technically trained in the United States and have sent many of their employees to the United States for training. All either have, or could quickly acquire, the skill necessary to operate a rubber processing plant.

Could acquire necessary skill very quickly

The establishment of a rubber goods manufacturing plant offers excellent potential profit possibilities. In view of this fact, it should be possible to attract one of the large American companies to open a factory in the Philippines. The obvious advantages are as follows:

Advantages are obvious

a. Proximity to island-produced crude rubber (pre-war export, 1500 tons annually).
b. Adequate supply of reclaimable rubber.

c. Large potential consumption of rubber and rubber products.

Capital Investment	₱1,500,000
Annual Operating Cost	750,000
Gross Income	1,000,000

Annual Return on Capital Investment—16%

Furniture Industry

Can become a profitable venture

As a minor industry, furniture production can become a profitable business venture if full advantage is taken of the availability of cabinet woods, rattan and other forest materials. Many small shops and factories are now engaged in the manufacture of products but the main outlets for such work remain principally with custom orders which do not reflect the world demand. If modern, acceptable designs are adopted and the articles are produced in quantity and at reasonable price, the materials and the workmanship of the finished product will insure success on the foreign market.

Govt. agencies could assist

Although the furniture industry represents a private capital venture, Government agencies could assist materially by giving wide publicity to the expressed desires of foreign buyers through the medium of established commercial bureaus and Philippine Embassies and Consulates.

Architectural designers can also contribute to the furtherance of this industry by providing modern design at low cost. This would stimulate interest in the possibility of manufacturing furniture for any climate and taste, based on observations and knowledge gained through periodicals concerning world needs and information in this field.

Slack Barrel and Keg Industry

Nearly perfect container been produced

The manufacturers of wooden containers have produced a nearly perfect container in the slack barrel for non-liquids, tight barrels for liquids and kegs for heavy substances.

At the present time, the Philippines needs commercial containers such as the slack barrel and keg. These are strong and substantial, offering excellent protection from weather and good resistance to rough handling and packing.

Philippines has abundance of logs for barrels

The Philippines has an abundance of logs, from which barrels may be made. Barrels are not made from sawn or rough lumber, but are made directly from short lengths of logs in their forest state.

The establishment of a barrel factory will not only enable producers to supply domestic demands at a lower unit price but will create a new market for logs, will initiate a new craft and will increase employment.

Will increase employment

It is believed that the establishment of a barrel plant of approximately 600 barrels per day capacity would provide an ample supply of barrels to meet all domestic demands. The estimated capital investment required for a plant of this type and capacity would be ₱425,000. An annual return of approximately 20 per cent could be realized on this capital investment.

The plant would include dry kilns with steam power and all necessary machines. It is assumed that the logs will be purchased from local dealers. A considerable saving could be effected should the barrel plant operate its own sawmill.

Saving could be considerable

The capacity of this plant could be increased by the addition of new machines as needed. The more costly machines are included in the basic plant estimate. All essential machines are used for both tight and slack barrels, thus only a few changes are necessary to permit the manufacture of tight barrels for liquids.

It is considered desirable to establish a small barrel plant in the Philippines for economic and utilitarian reasons. Transportation of barrels will not offer any problem if they are not assembled complete. Barrels are packed in bundles called shooks and are finally assembled at the point of use.

Tanning Materials

In spite of the growing popularity of some of the synthetic tannins, most of the tanning materials still widely used are of vegetable origin.

The forest resources of the Philippines indicate that several varieties of tannin-producing wood bark exist. Some of these sources of tannin-producing barks are the bakawan (mangrove), camachile, anabiong, bitaog, kalumpit, and kariskis. Of these varieties, the tanning extract from the bakawan (mangrove), called "cutch", has gained the greatest prominence in the world market for tanning materials, ranking third with Quebracho and Chestnut wood being rated first and second, respectively. According to scientific findings (Bulletin of the Imperial Institute, London, 1929) "cutch" is considered to be the cheapest tanning material per unit tannin and has also a very strong penetrating power which is conducive to quick tannage.

Top prominence in world markets

Records from the Bureau of Census and Statistics show that the Philippine export of cutch from 1933 to 1938 averaged 5,300 tons

Camachile barks can be used

valued at approximately ₱680,000. For sole leather manufacture alone, local tanneries have used a considerable quantity. When there is a shortage in supply of cutch, camachile barks can be used. Based upon the number of animals slaughtered in the Philippines in the year 1937, it is estimated that 6,400 tons of tannin would be required to convert hides and skins to leather.

Enormous demand for "cutch" seen

The foregoing facts indicate that with the rehabilitation of the livestock and tanning industry, and with the establishment of the meat packing plants, there will be an enormous demand for cutch and other tanning materials.

It is recommended that an extraction plant with an annual capacity of 3,000 tons be established. The following is a financial investigation of the proposed plant:

Capital Investment	₱700,000
Gross Income	600,000
Annual Operating Cost	485,000
Net Profit	₱115,000
Annual return on capital investment	16.50%

The gross income is based on 40 per cent increase of the 1941 price which ₱154 per ton.

In the development of the cutch industry, the following recommendations are made:

1. That a comparative study of the stationary type plant and the floating type plant be made with a view toward the selection of the most suitable type.

Recommendations for development of "cutch" industry

2. That regulations for the protection of forests from indiscriminate cutting be instituted and rigidly enforced. Currently there seems to be considerable destruction of young saplings in the Manila, Mindoro and Quezon areas.

3. Reports indicate that Brazilan quebracho can be grown successfully in Mindanao. Considering the superiority of this tanning material for treatment of upper leathers, it is strongly recommended that continued experiments be conducted in order to determine the commercial possibilities of developing this important material.

PUBLIC SERVICES

POWER

THE PROPOSED INDUSTRIAL expansion makes it absolutely necessary to develop sources of adequate power to sustain such expansion. The rapidity with which these power sources are developed will naturally determine the rate of industrial progress.

At the present time the means by which electric power can be economically produced are as follows:

Water Power—Hydro-electric
Steam Power—Thermal-electric
Diesel Power—Diesel-electric

The production of hydro-electric power depends upon the availability of water power. Installation costs are usually quite high, but operating and delivery costs are generally much lower than these of steam or diesel installations, thereby providing a correspondingly high return on the initial investment over a period of years. Inasmuch as the Philippines has approximately eighteen separate sites of potential hydro development, the consideration of this type of power source is entirely feasible.

Advantages of thermal-electric power source

The production of thermal-electric power depends largely upon a source of fuel and an adequate water supply. The advantages of this type of power source are that installation costs are generally lower than those of hydro power, location can be dependent upon existing or potential power markets and full advantage may be taken of any of the various type fuels available. In the production of thermal-electric power, fuel costs constitute a considerable factor in the determination of total operating costs. Although the larger percentage of all fuels have been imported in the past, the availability of sufficiently high grade coal in various parts of the islands, the proximity of the Philippines to the various Far East oil development projects and the possibility of local oil sources being developed indicates a sufficient quantity of low cost fuel to justify the establishment of thermal-electric power plants where necessary.

Diesel-electric less economical

The production of diesel-electric power is usually less economical than that of either hydro or thermal power, mainly because the internal combustion engine is not as efficient as either steam or hydro plants. However, the continued use of diesel-electric units for the production of electric power in remote or rural areas where the existing or potential markets do not justify the incident transmission costs can be easily forecast.

The various means of electric power production have been pointed out. While the development of hydro-electric power sufficient to meet the entire commercial and domestic requirements of the country may seem desirable, the considerations of economic possibilities, physical practicability and social desirability are such that the retention and utilization of all three types of electric power production, adequatedly coordinated, controlled and directed, will, in all probability, be justified for some years to come.

Comprehensive plan for development of hydro-electric power

The National Power Corporation has prepared a carefully considered, practical and comprehensive plan for the development of hydro-electric power in the Philippines. This plan calls for the installation of a series of hydro-electric plants, inter-connected where possible and designed to replace the dispersed and inadequate diesel plants now supplying certain municipalities and industries. The program calls for the construction of hydro-electric plants at favorable sites, supplemented by large capacity steam, diesel and gas units strategically located for stand-by capacity, or where no favorable hydro sites exist. Interconnection of plants will provide diversity and reserve power.

Will provide better service

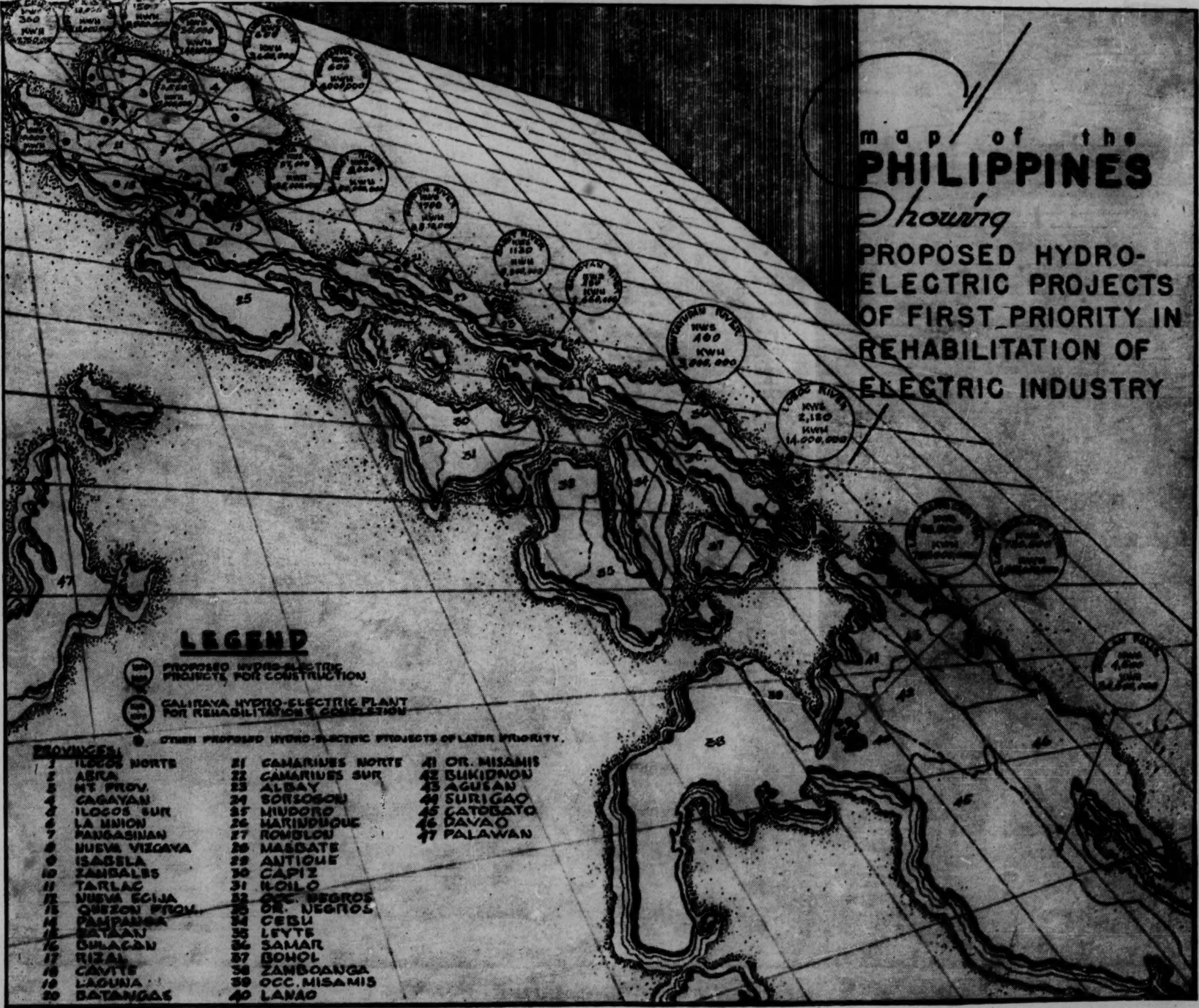
The gradual replacement of fuel-generated power with hydro-electric power will eliminate the inefficient small diesels and will absorb the industrial loads now served independently. The development of these hydro-electric sites will not only more adequately provide service to present communities but will extend services to new communities and industrial centers and will doubtless encourage the industrial and economic development of large new areas.

The prewar capacity of all electric power-producing systems, including independent systems supplying power to sugar mills, rice mills, lumber mills, coconut oil mills, mining and other enterprises, has been estimated as follows:

Commercial and Industrial Systems	
Manila Area	55,000 Kw.
Provinces	47,000 Kw.
Independent Industrial Systems	195,000 Kw.
Total	297,000 Kw.

It is estimated that approximately 60 per cent of these systems have been rehabilitated.

The program of industrial development proposed will require an additional 207,000 kw. of installed capacity in addition to an estimated 25,000 kw. required by the foreseen expansion of independent industrial systems. The increased commercial and industrial



map of the PHILIPPINES Showing PROPOSED HYDRO-ELECTRIC PROJECTS OF FIRST PRIORITY IN REHABILITATION OF ELECTRIC INDUSTRY

KWS
1130
KWH
KWS
400
KWH
3,000,000
ILOCOS RIVER
KWS
2,150
KWH
14,000,000
LEGEND
PROPOSED HYDRO-ELECTRIC PROJECTS FOR CONSTRUCTION
CALIRAYA HYDRO-ELECTRIC PLANT FOR REHABILITATION & COMPLETION
OTHER PROPOSED HYDRO-ELECTRIC PROJECTS OF LATER PRIORITY.
PROVINCES:
1 ILOCOS NORTE
2 ABRA
3 MT PROV.
4 CAGAYAN
5 ILOCOS SUR
6 LA UNION
7 PANGASINAN
8 NUEVA VIZCAYA
9 ISABELA
10 ZAMBALES
11 TARLAC
12 NUEVA ECIJA
13 QUEZON PROV.
14 PAMPANGA
15 BATAAN
16 BULACAN
17 RIZAL
18 CAVITE
19 LAGUNA
20 BATANGAS
21 CAMARINES NORTE
22 CAMARINES SUR
23 ALBAY
24 SORSOGON
25 MINDORO
26 MARINDUQUE
27 ROMBLON
28 MASBATE
29 ANTIQUE
30 CAPIZ
31 ILOILO
32 OCC. NEGROS
33 OR. NEGROS
34 CEBU
35 LEYTE
36 SAMAR
37 BOHOL
38 ZAMBOANGA
39 OCC. MISAMIS
40 LANAO
41 OR. MISAMIS
42 BUKIDNON
43 AGUSAN
44 SURIGAO
45 CATOBATO
46 DAVAO
47 PALAWAN

demand induced by the above-mentioned industrial development, the increase in population and the stimulated desire for a higher standard of living is estimated to be 80 per cent of the pre-war commercial and industrial total or an additional 81,500 kw. These totals can be summarized as follows:

New industrial	207,000
Independent industrial	25,000
New commercial & industrial	81,500
Total	313,500

Recapitulation of capacities

A recapitulation of present capacities, required rehabilitation and expansion capacities, showing total requirements in kilowatts, is as follows:

Present capacities:		
Commercial & Industrial	60,000	
Independent Industrial	117,000	177,000
Rehabilitation requirements:		
Commercial & Industrial	42,000	
Independent Industrial	78,000	120,000
Expansion requirements:		
Commercial & Industrial	81,500	
New Industrial	207,000	
New Independent Industrial	25,000	313,500
Total		610,500

Analysis of new industrial power needs

Analysis of the new industrial power requirements indicates that the bulk of the power requirements will be centered in the Manila, Lake Lanao and the Mountain Province areas. The following chart indicates the overall power requirements for the proposed industries and the probable sources of such power.

Industries Location of New	*Power Requirement*	*Power Source*		
		Hydro		*Steam or Diesel*
		Project	*Capacity*	
Manila	39,100	Botocan	16,000	97,000
		Angat	18,000	
		Caliraya	36,000	
Batangas	12,450			
Laguna	400			
Rizal	1,000			
Tayabas	8,300			
Lanao	88,600	Lanao	100,000	
Pangasinan	1,200	Camiling	2,560	
Agusan	1,100			1,100

Albay............	400	Barit............	400	320
Camarines.........	2,200	Barit............	3,100	2,600
		Bosigon...........	1,700	650
Sorsogon..........	800	Cawayan..........	480	200
Bataan............	2,600			400
Batanes...........	650			4,000
Bukidnon..........	150			4,000
Capiz.............	400			
Cebu..............	4,150	Mantayupan.......	450	
Cotabato..........	3,350			
Davao.............	3,250	Sibulan...........	4,500	
La Union	350	Amburayan........	350	
		Chute............		
Ilocos............	1,300	Casgas...........	1,500	
Iloilo............	2,000			2,000
Masbate...........	6,000			6,000
Mindoro...........	400			400
Misamis...........	650			650
Mountain Prov. ...	12,000	Agno.............	30,000	
Negros............	11,900			12,000
Nueva Ecija.......	700	Penaranda.........		
		Talavera..........	600	
Palawan..........	200		600	200
Samar............	600			600
Zamboanga........	800		750	
TOTAL.......	207,000		216,909	132,120

The Lake Lanao area will require an estimated capacity of 88,600 kw. The Maria Cristina Falls project has been surveyed by the National Power Corporation and a considerable amount of planning and research work has already been done. This project will have an estimated ultimate capacity of 200,000 kw., although it is felt that it will be advisable to install a plant of 70,000 kw. initially and expand this as necessary. However, when it is considered that the addition of one nitrogen fixation plant (ammonium sulphate) plus five ferro-chrome units together with the eventual expansion of the nitrogen plant would require approximately 83,000 kw. additional capacity over and above the present anticipated industrial requirement of 88,600 kw., not including commercial and domestic requirements for that area, it is immediately apparent that unless a long range plan is developed and actual construction begun without delay, any extensive industrialization in this area will be immeasurably delayed.

Long-range plan must be developed

The estimated cost of this project for 70,000 kw. capacity is ₱21,930,000, or a unit cost of ₱313.30 per kilowatt.

The Manila area has been divided into four major subdivisions as follows:

a. Manila, Rizal: Two 25,000 kw. steam units, one 30,000 kw.

marine steam unit, one 4,500 kw. steam unit and one 12,500 kw. steam unit, or a total of 97,000 kw. capacity.

b. Caliraya River Falls, Laguna: Four units of hydro power totalling 36,000 kw. capacity at ₱314.00 per kw.

c. Botocan River Falls: Hydro capacity of 16,000 kw. at ₱350.00 per kw.

d. Angat River Falls: Hydro capacity of 18,000 kw. at ₱400.00 per kw.

Mountain provinces to be supplied with hydro power

The mountain provinces will be supplied with hydro power from the Agno River Falls. Two installations are planned for this area, one known as the Ambuklao project with an ultimate capacity of 18,000 kw. and the other, the Itogon project, with an ultimate capacity of 12,000 kw. It is estimated that these projects may be developed at a cost of ₱417 per kilowatt.

Increased water storage capacity

The Caliraya station has just completed the installation of the third 10,000 KW. generator and recent information reveals that the fourth unit has been approved for installation. This unit will have a rated capacity of 8,500 KW. Additional funds are being requested to finish the existing earth dam to the planned elevation. This latter program is designed to correct the section of the dam and to increase the safety factor. The overall improvement of the dam site will undoubtedly enable the reservoir to utilize increased water storage capacity for the full demand of four generators. The completion of the Caliraya installation is of vital importance to Manila power requirements and it is strongly recommended that the improvement works on the dam and the installation of the fourth unit be immediately instituted.

The estimated completion costs in thousands of pesos of the other hydro-electric projects, the completion of which is required for the supply of necessary power for the various industrial projects, are as follows:

Camiling	2,440
Barit	1,190
Cawayan	285
Bosigon	2,025
Mantayupan	330
Sibulan	1,705
Casgas	720
Penaranda	465
Talavera	355
Total	9,515

In view of fluctuating material, equipment and labor costs, it is very difficult to forecast the actual cost of instituting a power program of this magnitude. However, the best estimates of competent experts are that the following expenditures are the minimum amounts necessary to support the proposed industrialization program:

Very difficult to forecast actual cost figures

(Thousands of pesos)

	1948	*1949*	*1950*	*1951*	*1952*
Hydro-electric power projects	12,000	12,000	14,000	16,000	18.000
Steam	8,000	8,000	8,000	8,000	8,000
Diesel	1,500	1,500	1,500	2,000	2,000
Total	21,500	21,500	23,500	26,000	28,000

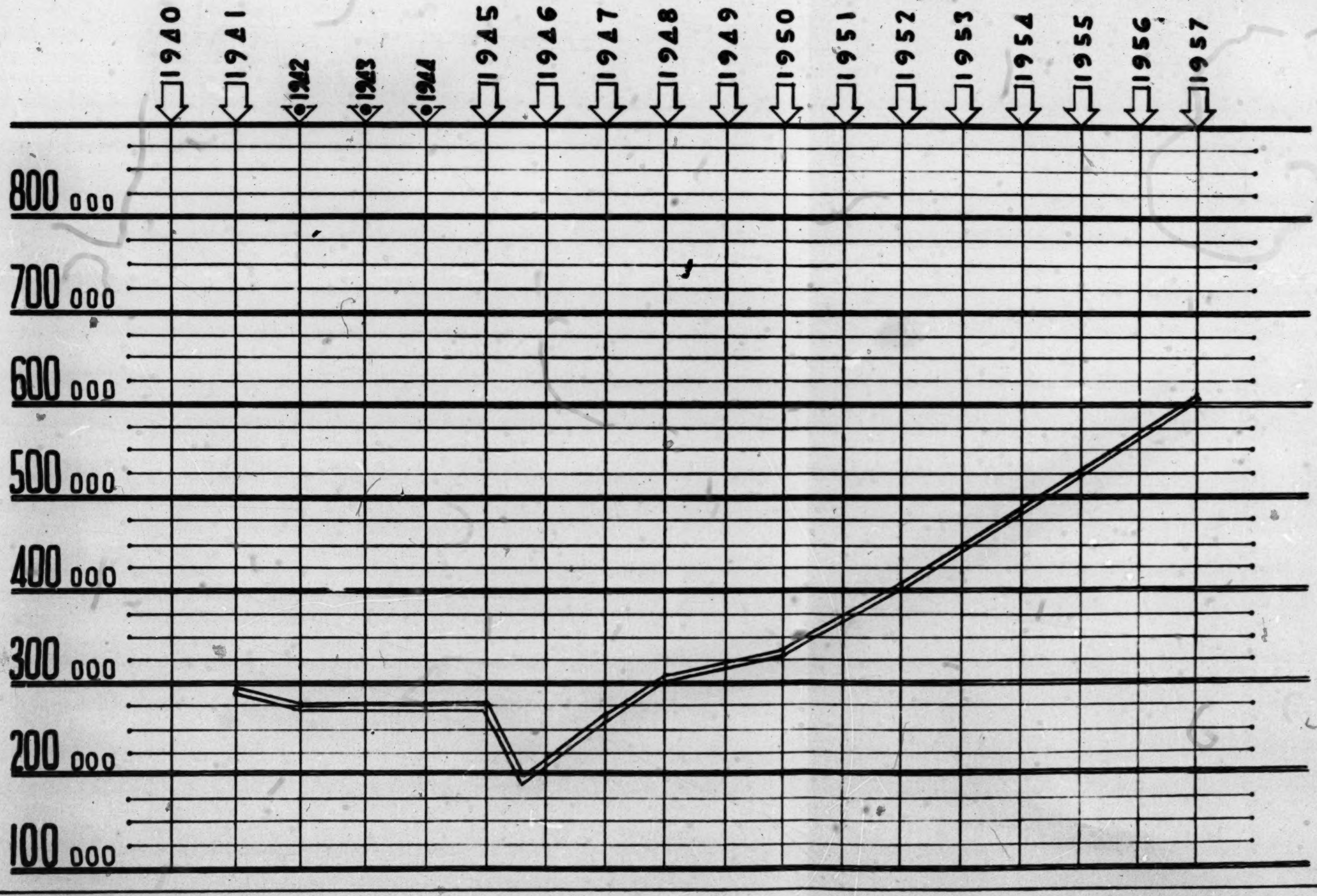
The above figures do not include transmission costs and are subject to revision by the National Power Corporation which will not only be called upon to recommend power development in accordance with the approved industrial program but will be responsible for the surveys, locations and construction of the required installations.

In order that the proposed industrialization program may be successfully undertaken, the Government must immediately initiate a progressive power program of sufficient scope to sustain the proposed industries.

The principal problem is that of the Mindanao area, for which many basic industries have been planned. The development of these industries requires that low cost power be made available in large quantities. Hydro development will supply this power. However, the estimated completion date of the initial phase of the Maria Cristina hydro-electric project has been established at 1952, provided that this work is undertaken without delay. In view of this fact and inasmuch as the establishment of the contemplated industries should not be that long delayed, it has been suggested that a thermal plant such as the 63,000 KW capacity Kizugawa steam plant or any other block of power of comparable size received as reparations from Japan be constructed within the next two years. Subsequent to the completion of the initial stage of the Maria Cristina hydro project the two systems can be interconnected until the capital investment in the thermal plant can be relegated to a stand-by status. This suggested method of providing power to Mindanao will enable the capital investment required to be spread over a longer period of time, obviously a definite financial advantage.

Maria Cristina project for 1952

Estimated Increase in NATIONAL POWER Requirements



Although it has been estimated that energy at the switchboard could be supplied at approximately ₱.025/KWH, the point has been raised as to whether or not the installation costs of used reparation equipment might not be such that the investment would not be justified, taking into consideration the depreciated value of equipment, etc. It is possible that new thermal equipment should be purchased. However, inasmuch as there are many other factors to be considered, it is recommended that an extensive study be made of the power development plan for the Mindanao area.

Subject to further study and revision

Although preliminary power surveys have been made throughout the Philippines, it must be pointed out that estimates as to hydro potentials and estimated developmental costs are subject to further study and revision.

Nationalization of all power resources may become a reality in the distant future. Many countries have found this policy not only necessary but entirely feasible. Inconsistencies in power rates must be limited and controlled, otherwise high rates such as are now charged will deter private ventures and will force the issue of nationalization of all public utilities in order to provide low cost electric power for new industries.

Transportation

The pre-war transportation facilities of the Philippine Islands were considered to be adequate. While a certain percentage of the facilities were established as part of a military defense plan, this proportion was so small that it may be said that all were established mainly for economic reasons.

U. S. Commissions in the Philippines

So important are transportation facilities considered to be to the rehabilitation of the Philippines that the United States Government has appropriated funds for this purpose and has established U. S. commissions in the Philippines which will be responsible for the making of appropriate surveys, the allocation of appropriated funds and the direction of all phases of the specific reconstruction program. The designation of these commissions and the scope of their activities are as follows:

Roads — U. S. Public Roads Administration
Aeronautics — U. S. Civil Aeronautics Association.
Shipping — U. S. Maritime Commission
Port Facilities — U. S. Corps of Engineers, District Engineers.

For purposes of discussion in this report, transportation facilities will be so divided, with the addition of the discussion on railroads.

L

Roads

Under the War Damage Act, the Federal Government's main concern is to repair the roads and bridges that were damaged or destroyed during the war, but this does not preclude the opening of new roads and the construction of new bridges if such projects are vital to Philippine economic rehabilitation and development.

In a talk before the Manila Rotary Club, on October 24, 1947, Mr. F. C. Turner, Director of Public Roads and Administration, revealed that his administration have already been allocated a total of ₱44,500,000 for its road restoration program. Of this sum ₱20,000,000 represents the 1947 allocation, while ₱24,500,000 had been allocated for 1948.

Mr. Turner disclosed that the 1947 allocation covers the cost of repairing the highways mostly in the Manila area and in Luzon as a whole, while the 1948 allocation will take care of the road building program for the entire country, including Mindanao and the Visayas.

The Public Roads Administration is entitled to one-third of the total authorization of ₱240,000,000 in the war damage legislation. The administration thus expects two more allocations for its highway reconstruction program before it winds up its work on June 30, 1950. Mr. Taylor estimated that about 15 per cent of the administration's project is now under construction.

62,000 vehicles cross city bridges in 8-hour period

It was disclosed that there are now around 32,000 vehicles registered in the City of Manila as compared to only about 15,000 before the war. A traffic survey shows that some 62,000 vehicles cross the city bridges during an eight-hour period.

Although Manila's traffic problem obviously cannot be solved by simply constructing more bridges, it could be considerably eased by widening the approaches to the bridges, such as the highways in the south side of the city.

Such projects as widening the approaches to Manila's bridges, however, are not at present covered by the allocation for road restoration. If funds from the present authorization will permit such additional construction after the repair and restoration program is completed, the idea that America's road experts have for easing Manila's traffic congestion could be put to work.

Two new super highways cost one million pesos

The two new super-highways in Manila—the Sta. Mesa Boulevard and Espana Avenue—cost the Federal Government approximately ₱1,136,000. The recently finished Sta. Mesa project alone cost ₱322,822. The Espana project is scheduled to befinished before Christmas.

Also under construction at present is the Malolos to Apalit highway on the North road outside of the Manila area. This project, which will cost about ₱1,641,000, will be of concrete and 24 feet wide. The roads administration will use new equipment in the restoration of this road.

Another new highway under construction

Pre-war highway and street systems, exclusive of right-of-way had an estimated value of ₱160,000,000 measured at pre-war cost levels. Estimated war damages are placed at ₱55,250,000 or 34.5 per cent of their pre-war value. Of this latter amount, an estimated ₱18,750,000 covers the loss or deterioration of bridges and ₱36,500,000 the damage to roads and streets resulting from lack of maintenance and other causes during the war years. Overall road and bridge damages represent approximately 43 per cent of all war damage to public works.

Although the expenditures for roads and highways are expected to be considerable, the funds involved will be returned in the form of vehicle taxes, fuel taxes and provincial tax percentage returns. The rate of amortization on loans of this type, provided the project is a sound one, is usually fairly rapid.

Rate of amortization usually fairly rapid

Due to the uncertainty as to the extent of industrialization, the rate of industrialization and the location of the proposed industries, it is impossible to accurately estimate the additional transportation facilities which will be required over and above the normal expansion necessary to provide for the country's increased population. However, a conservative estimate would be that on an extensive industrial program, the finances required for the expansion of existing or the construction of new road nets may approximate 5 per cent of the total industrial investment. It has been estimated that a desirable initial post-war highway, street and bridge construction program would require a minimum of ₱134,300,000 or an average expenditure of ₱27,000,000 until 1951.

Aeronautics

Prior to the war there was very little commercial air activity in the Philippine Islands, few civilian planes being used and the majority of the few airstrips having been established for reasons of military defense. Shortly before the war an ambitious but small scale military airfield construction program was initiated. During the Japanese occupation the Japanese military forces expanded the then existing airfields and built others. It was only during the Philippine campaign of liberation, however, that the construction of airfields and airport facilities reached large scale proportions,

Little commercial activity prior to the war

Numerous military airfields available

both in conjunction with the then current local military air operations and the projected raids on the Japanese homelands. The end of the war found all of the larger islands equipped with very adequate airfields and airport facilities. So numerous are the military airfields now available for civilian use that the amount of air traffic to be expected for the next few years will not warrant the active operation of all of these fields.

Commercial traffic expanded tremendously

Commercial air traffic has expanded tremendously and has been readily accepted by the people. Traffic is confined mainly to passenger carrying, although freight services are available and may be considered relatively heavy as compared to population, etc. It is felt that this phase will expand rapidly, especially in connection with the transportation of perishable goods.

The United States Civil Aeronautics Administration has a commission in the Philippines whose mission is to assist the Philippine Bureau of Aeronautics in its tasks. A sum of ₱16,000,000 has been appropriated for this specific purpose but obviously this is not a large amount. The sum involved will be spent for the conversion of one of the existing fields into an international airport, the maintenance and operation of an international system of communication aids and the establishment of a suitable local radio communication net and navigation aids. It is felt that the expenditure of these funds will enable the Philippines to supply adequate facilities for its own domestic system and to adequately assume its responsibilities as a member of the international airway system as well.

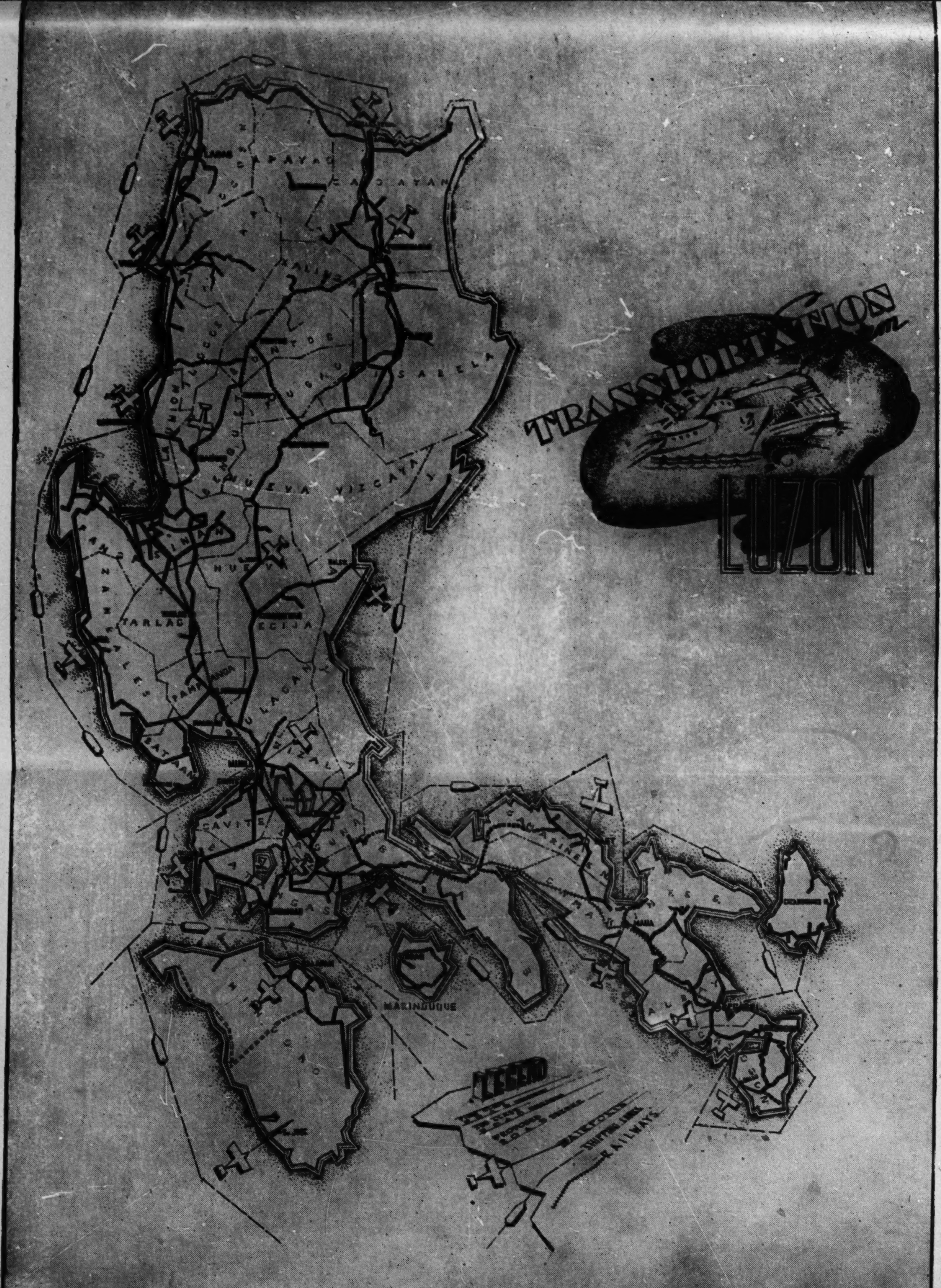
Amount of local air traffic in November, 1946

An example of the amount of local air traffic may be seen in the compilation of hours flown by the two authorized scheduled carriers, recently consolidated as Philippine Airlines, for the month of November 1946:

No. of passengers	35,753
Hours flown	3,967.15
Miles flown	527,481
Passenger miles	6,821,232
Mails carried, lbs.	35,332.019
Express carried, lbs.	1,415,986

96 airstrips in various islands

There are at present 96 airstrips located in the various islands, some of which are as yet inadequate for landing heavy types of aircraft. However, the improvement of these fields to the minimum requirements as to length and width of runway is now under consideration. As conditions improve, these minimum requirements will


TRANSPORTATION
LUZON
APAYAO
CAGAYAN
KALINGA
BONTOC
ISABELA
NUEVA VIZCAYA
PANGASINAN
NUEVA ECIJA
TARLAC
ZAMBALES
PAMPANGA
BULACAN
BATAAN
RIZAL
CAVITE
LAGUNA
BATANGAS
CAMARINES NORTE
MARINDUQUE
LEGEND
AIRPORTS
SHIPPING LINES
RAILWAYS

be made to approach those prescribed by the United States Civil Aeronautics Administration.

Makati and Nichols field, the two main airports in Manila, are at present the only two airfields which have lighted runways for night landing, but it is understood that beam control landing equipment will soon be installed at all the major airstrips.

Two main airports in Manila today

Plans are now being drawn up for turning Nichols field into an international airport, complete with a new 10,000 foot runway to accomodate the largest passenger planes now operating, including the new DC-7 which is still in experimental stage. Also included in this planned new airport will be a hotel, air-conditioned waiting rooms for the passengers, rest rooms, a theater and large scale recreational facilities.

Plans for new international airport

When completed, this new international airport should be the finest in the Far East. Officials hope to start operations on December 1, 1947, but it will be some time yet before the proposed new buildings can be erected.

Space has been allocated on the field for all airlines at present operating in Manila. It is further hoped that the excellent facilities provided here will attract outside airlines such as BOAC, KLM, and AIR FRANCE, all of which could thus establish a connecting link with American airlines.

Should attract outside air lines

The latest plans also include the establishment of four omnidirectional radio ranges which will be sufficient to control the entire aeronautical network of the Philippines. In all probability, ranges will be set up at Laoag, Manila, Cebu and Zamboanga. It is estimated that all this would be accomplished within the next two years, putting Philippine airlines on an equal footing as regards safety flying condition with any other nation in the world.

Shipping

Prior to the war, the Philippines was very well serviced in the inter-island trade by local shipping lines and provided ports of call for nearly all of the international lines. The ships used in the inter-island trade were fast, well constructed, provided excellent accommodations and furnished very good service.

Well serviced in inter-island trade

Pre-war registry of vessels of all kinds totalled approximately 3,500 craft with an aggregate tonnage of 155,000 tons. Inter-island trade was carried by 160 vessels operated by some 50 steamship lines connecting all of important ports of call throughout the country. Vessels of Philippine registry comprised less than one per cent of the net tonnage of ships engaged in foreign commerce but by May

1941 there were eleven vessels with an aggregate net tonnage of 38,000 tons operating in foreign shipping under the Philippine flag.

All vessels were either sunk or captured when war started

At the outbreak of the war all of the inter-island vessels were either sunk, commandeered by the armed forces or were captured by the Japanese. Consequently, on the liberation of the Islands by the American forces, the Philippines had no ships available with which to resume service, although claims for war damages had been instituted and every assurance of their being paid had been given. Total damages have been roughly estimated at approximately ₱85,000,000 based on replacement values.

Shortly prior to the Japanese surrender it became evident that shipping had to be rehabilitated without delay in order for the country to effect an early recovery. For this reason the U. S. Maritime Commission was authorized to make available to the Philippine Government, which in turn would make them available to qualified operators, the following vessels:

44 FS type
5 F class

In addition, the U. S. Maritime Commission actually scheduled service to nearly every port in the Islands with the following larger vessels:

5 C1 . MAV 1
4 N3
1 steam lumber schooner

First step in aiding economic recovery

. The first mission of these larger vessels was to call at every copra port in the Islands to take out copra as a first step in aiding economic recovery.

No estimate of the amount of money that the U. S. Maritime Commission made or lost in this venture is available but it is felt that there were tremendous hidden costs. The reasons for the anticipated losses are as follows:

Pre-war rates were followed.
Operation was inefficient due to many extra ports of call.
Ports were damaged to a great extent.
Stevedoring was very inefficient.

However, in view of the great necessity for immediate corrective action, it was felt that any cost was justified.

Since 1945 over 350 vessels were registered in the port of Manila and these ships comprised many types principally for inter-island traffic. Total tonnage involved is approximately 20,000 tons and in addition there are 39 motor ships under United States registry with a net tonnage of 19,000 tons.

At the present time, a program is being instituted whereby the U.S. Maritime Commission will charter to the old established Philippine shipping lines ships on a "bare boat" charter, rates to be 10 per cent of vessels' value per year and no recovery clause. This program will be projected until such time as pre-war tonnage is reached or shipping demands satisfied.

Shipping program being instituted

No plan has been formulated for the purchase of these vessels although sale of surplus vessels under the same regulations as applied to other countries is of course possible. However, in view of the fact that the surplus vessels are probably not efficiently designed for inter-island trade it is doubtful that the companies involved will wish to purchase many of them. It is thought that they shall probably want faster, more efficient vessels, capable of carrying more passengers in a more comfortable manner.

In addition to the program outlined above, the Bell Act provides for the training of 50 merchant marine cadets in a four year course at one of the United States Merchant Marine Academies. These 50 "pensionados" are now completing their first year of training.

Training of 50 "pensionados"

In general, various estimates indicate that approximately ₱50,000,000 will be required in the next five years for complete rehabilitation of Philippine shipping and to develop an overseas trade in Philippine registered bottoms.

Port Facilities

The pre-war port facilities of the Philippine Islands were realistically conceived and executed. In most cases, they were adequate for the pre-war trade and the then prospective commerce. There were 64 national ports and 17 municipal ports of which the port of Manila was overwhelmingly the most important.

The ports were gravely damaged by the war and although some construction and expansion was done by the armed forces of the United States to satisfy military requirements, this work was of a temporary nature, the life of which is likely limited to three to five years.

Construction and expansion done by U. S. forces

The President of the United States, through the Secretary of War, designated the Corps of Engineers of the United States Army to prepare a study of the requirements for the rehabilitation and expansion of port and harbor facilities of the Philippines and to prepare a report with general plans and estimates of cost of such additional works as would be needed in the post war period, both from a standpoint of national defense and a reasonably prospective commercial development.

Although the actual damages to ports and harbors due to the Japanese invasion was relatively small, the damages caused by lack of maintenance during the Japanese occupation and the American counter invasion were tremendous. The rebuilding by the armed forces, as previously discussed, was in many cases far in excess of normal commercial requirements but, because of the emergency character of the construction, its more rapid deterioration is to be expected.

Actual damage to ports was small

An appropriation of ₱36,000,000 has been made for the purpose of reconstructing and improving port facilities. However, in view of the limited appropriation and the difficulties involved in acquiring necessary construction materials, it is expected that by the end of the fiscal year 1951 only sufficient funds and time will be available to restore the various ports to their pre-war sizes and standards. It is obvious, then, that further port and harbor facilities necessary to sustain the anticipated industrial program must, of necessity, be financed by the Philippine government and/or the industries planned. It is estimated that approximately 2 per cent of the total industrial capitalization will be required to provide adequate port and harbor facilities.

Railroads

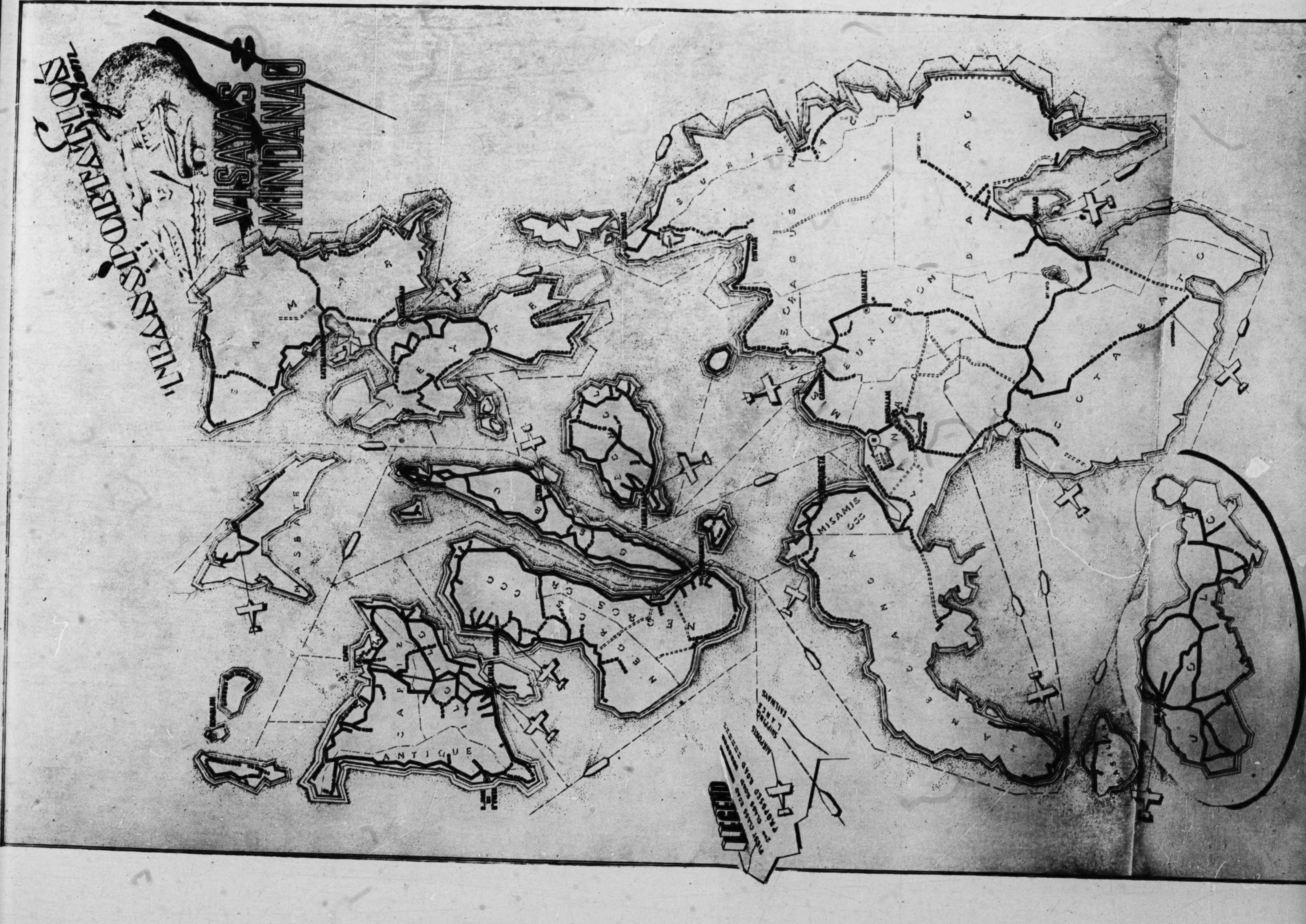
Manila Railroad Company

Prior to the war, the railroads of the Philippines provided adequate servie and their expansion, to a great extent, was determined on the basis of need. The Manila Railroad operated in Central and Southern Luzon and was constructed by British capital but is now owned and operated by the Philippine Government. The Philippine Railroad, which operated two small lines, one on the island of Panay and the other on Cebu, is American and Philippine owned.

Between 1917 and 1937, ₱10,000,000 was spent on new equipment including cars, locomotives, coaches, couplings and air brakes by the Government-owned Manila Railroad Company. This company operated 1,140 kilometers of line with an extensive network of bus routes. Only 13.5 kilometers of the line was double track, the rest being single track.

Only 66 engines now in operation

Before the war, the Manila Railroad had a rolling stock of 159 locomotives, 208 passenger coaches, 65 rail motor cars, 100 rail motor car trailers, 94 express cars and cabooses, 1;978 freight cars, 101 service cars and 390 trucks, busses and automobiles. In 1947, only 66 locomotives are in operation, of which 17 had remained in service, four are old locomotives which have been repaired, with 45 locomotives which had been turned over to the railroad by the U. S. Army. At present, 845 kilometers are being operated.



TRANSPORTATION system
VISAYAS
MINDANAO
LEGEND
FIRST CLASS ROAD
2nd CLASS ROAD
PROPOSED ROAD
AIRPORTS
SHIPPING LANES
RAILWAYS
MASBATE
ANTIQUE
NEGROS
MISAMIS OCC

Despite the rehabilitation work which was done by the American Forces, however, both the Manila Railroad and the Philippine Railway Company are desperately short of equipment. Neither the Panay nor the Cebu lines are in operation at the moment.

Some 330 bridges were destroyed in the war, but recent reconstruction of a few of them has enabled the Manila Railroad to resume service as far north as San Fernando, La Union Province, and as far South as Ligao, Albay Province, in the south. From Ligao, there is a bus connection to Legaspi, which is 30 kilometers away. The line to Lipa in Batangas may be resumed but cannot be rehabilitated at present owing to lak of funds.

Main needs at the moment

In the main, the need is for bridge construction, replacement of depreciated and inefficient rolling stock, and the acquisition of additional rolling stock. Replacement of the present steam locomotive by diesel power units would be of definite advantage in increasing the efficiency of the system.

The American and Philippine owned Philippine Railway Company operated 212 kilometers of single track—116 kilometers on the island of Panay and the remainder on Cebu. The locomotives were coal burning.

While the Panay division of this railroad was not seriously damaged in the war, the Cebu section was completely smashed up. The total war losses of the Philippine Railway Company have been estimated at ₱25,000,000 on the basis of 1940 replacement cost.

Feeder bus, truck lines possibly give better service

There has been consideration given to the subject of expansion of the existing system once rehabilitation has been effected. However considering the high cost involved in heavy construction at the present time, and also the financial status of the country, the practicability of expansion is questionable. It is thought that the establishment of feeder bus and truck lines will possibly provide better service at much less cost than the establishment of spur lines, speciallv considering the short hauls involved and the construction difficulties envisaged owing to adverse terrain features.

The direction in which to proceed regarding expansion cannot be clearly seen at the moment. It is felt that any present decision would be premature and that while adequate survey and study should be made, the final analysis and decision should await the establishment of an industrial policy and should also be based on the indicated need at that time.

Communications

One of the greatest achievements of the Philippines is the advanced and progressive development of its communication systems. The last war had practically destroyed communication facilities, so that at the end of the war the country was isolated from the rest of the world except through the medium of the United States Armed Forces communication systems. In less than two years after liberation remarkable progress had been achieved, pre-war levels of efficiency in some phases of the service having been reached. This is especially true with respect to radio service.

Remarkable progress been achieved

At the present time, there are six radio transmitting stations operating on different frequencies, aside from the newly constructed million-dollar radio transmitting and relaying station at Malolos, Bulacan, the purchase of which the Government has been negotiating for sometime. The acquisition of this station will establish the Philippines as the center of radio communication in the Far East.

Six radio stations

More progress is expected on telegraphic systems and overseas telephone service. The Philippine Long Distance Telephone Company has far resumed only 30 per cent of its activity. The Company sustained about 90 per cent damage, estimated at ₱14,429,882. The Davao Telephone Company, a wholly-owned subsidiary of Long Distance, suffered damage estimated at ₱178,268. However, the Company has resumed its services in Manila and has been able to establish radio-telephone service between Manila, Canada, Cuba, Hawaii, Mexico and the United States.

The Bureau of Posts, maintaining the postal, telegraph and radio service throughout the country, suffered tremendous damages to its installations. At the present time 1,018 post offices have been reopened in the Philippines but of the 459 pre-war telegraphic offices, only 150 have so far been re-established.

The further expansion of communication systems will depend, to a great extent, upon the expansion of local and foreign trade and commerce. Inasmuch as the majority of the systems are in the hands of private enterprise, their development can be expected as the need and the possibility of profit is established.

Further expansion will depend on foreign trade

Sanitation

The problem of providing proper sanitary facilities throughout the Republic is one of tremendous magnitude. In the Manila area alone, sewers and other disposal systems suffered considerable damage as a result of military action. To repair and modernize sanitary facilities nationally will entail millions of pesos over a long period of years.

To discount the menace to public health from inadequate sewage disposal systems is to jeopardize the health standards of future generations. A sound program aimed at the education of all communities to the importance of proper sewage and garbage disposal is deemed the first essential step towards the accomplishment of an improvement in health standards throughout the nation.

Proper sewage and garbage disposal plan

The recent protest against the dumping of raw garbage in the Santa Mesa district of Manila indicates the necessity, by public reaction to such practices, of installing a garbage disposal plant where such refuse is disposed of by modern incineration methods. In every major city, an installation of this type should be a prerequisite. The plant should be sustained by organized collection teams whose equipment is designed for ready removal of waste materials. Reviewing the situation in Manila proper, it is recognized that the ancient sewer system is fast becoming inadequate to meet the demands of a growing city. Contributing factors to the problem are the low tidal basin and general topography which renders natural flow augmented by pumping stations a constant source of trouble. The intricate canal system installed years ago to provide a tidal method of disposal now remains inoperative so that on many days it has been observed that these same canals are stagnant with resultant putrefaction of fecal and other organic matter. It is also recognized that shortage of funds and materials contribute to the delay of replacing and repairing the existing system into a fair semblance of operation. Nevertheless, the Government with its responsibility for the welfare of the public cannot escape the duty of providing the necessary measures to overcome a serious defect in the increasing pollution of the rivers and bays adjacent to the nation's important cities. The result of such pollution from sewage and industrial wastes tends to kill all marine life in the near vicinity of the cities.

Ancient sewer system becoming inadequate

Shortage of funds and material causing delay

With the expanding population in Manila proper, it is necessary that pumping stations and central sewage disposal plants of a mechanical digestion type with filtration beds be installed in order to purify all sewage and organic wastes. In smaller communities, a simple Imhoff tank and sand filter beds would suffice for communities of 5000 or less population. In small villages, a septic tank arrangement can be installed satisfactorily with chlorine treatment of the affluent produced by the tank. The following recommendations are made:

Sewage disposal plant must be installed

1. That the Bureau of Public Works be authorized sufficient funds to conduct a long range study of the sanitary problems throughout the nation.

2. That the present foundry operated by the Bureau of Public Works be enlarged and improved to expand its production of cast iron pipe.

3. That absolute controls be set up against the indiscriminate dumping of raw garbage in open areas.

4. That, as a temporary measure, ditches be provided adjacent to residential areas to drain off stagnant pools of water and other matter to small septic tanks or leaching pools.

Immediate action must be taken

The cost of introducing sewage facilities in the more populous areas cannot be estimated at this time. However, it is felt that immediate corrective action should be taken, based on extensive surveys.

The following suggestions are offered as emergency measures to alleviate the serious garbage problem:

1. That Municipal ordinances be passed requiring that all households place their garbage in covered metal or tight wooden containers.

2. That these containers be emptied by garbage pick-up trucks and containers set back on the ground not less than once each week.

3. That garbage trucks unload this raw garbage into scows at convenient intervals on navigable streams within city limits or on sea fronts for dumping at sea, or that, in rural or inland areas, the garbage collected be consumed in garbage disposal systems, burned or buried.

Water Systems and Irrigation

Water Systems

Extensive repairs required by all water systems

Extensive repairs are required by all principal water systems in the cities of Manila, Iloilo, Cebu, Zamboanga, etc. The damages were particularly severe in the Manila area. Broken lines have been temporarily repaired but the shortage of materials and funds have hampered further extension and reconstruction of other principal underground mains. Pre-war consumption of water in Manila has been estimated at 40,000,000 gallons per day. At the present time consumption has increased to 76,000,000 gallons per day, of which 20 per cent is calculated as pilferred and 20 per cent lost through leakage, etc.

Expansion is recommended

The Metropolitan Water District operates a small foundry which produces approximately 500 tons per year of cast iron pipe. It is recommended that the plant be expanded in order to increase production of this vitally needed material. In other sections of this report, it has been mentioned that gray iron foundries and concrete pipe plants are recommended. The construction of these plants will provide a sufficient supply of pipe to properly maintain and expand the existing water systems.

Water shortage in Cebu

In the city of Cebu, it has been reported that the system is dependent upon Diesel power pumps. The main line to the city is undersized, with the resultant water shortage throughout the city during peak loads.

Supply of chlorine also been a problem

The supply of chlorine has also been a problem during recent months and application of chlorine to the raw water supply has been reduced to one and one-half parts of chlorine per million. This is under the normal chlorination practice of two parts per million. The supply of chlorine can be amply insured by the establishment of a caustic soda plant as recommended. It is estimated that an expenditure of ₱20,000,000 will be required to improve and expand water supply systems throughout the Philippines, particularly in the development of new communities and improvement of existing areas.

Irrigation

Careful study to lifting water from river valleys

The irrigation of upland rice fields and areas not readily serviced by a natural flow of water, such as the great central plain of Luzon, requires long study and application of proper measures to increase the agricultural areas and their production. There have been a number of suggestions extended as to the possible ways and means by which irrigation can be accomplished mechanically. It was also reported that gravity systems are being encouraged. It has been estimated that the devolpment of this system would cost approximately ₱600 an acre. This latter method is being applied to the lowland farm areas. Careful study should be given to the possibilities of installing pumping stations to lift water from river valleys up to the higher areas to provide an average of approximately one and one-half liters of water per second per acre. Although the upland farm areas, particularly rice, yield around 25-30 cavanes per hectare without irrigation applied, there is every reason to believe that increase in production will be greater with ample water facilities. It is recommended that a fund of ₱10,000,000 be set aside for the long range development of the overall irrigation program.

Hospitals

Prime targets of Japanese

Hospitals were one of the prime targets of the Japanese invasion and none were spared. As the physical damage is difficult to evaluate, an approximate figure is given for the rebuilding of the structures. The Japanese either confiscated or destroyed all of the equipment. A preliminary list of vital equipment has been submitted and a replacement cost estimate has been prepared from this list.

From the preliminary lists of surgical, laboratory equipment, beds and linen required, it is estimated that approximately ₱30,000,000 will be needed for the initial funds to institute a complete refitting and equipping of all hospitals throughout the country. Building costs are estimated to be not less than ₱75,000,000, this figure being subject to revision on computation of unit cost as mentioned herein. The Bureau of Health has 54 hospitals and 9 leprosaria and in view of the almost total destruction it is suggested that one hospital unit be completely repaired and equipped so that a careful record of costs are kept. In this manner total estimates for rehabilitation work can be more accurately estimated.

Govt. should repair and equip one complete unit hospital

The Philippine Government should immediately repair and equip one complete unit hospital and then allocate the necessary funds for the complete restoration of all other damaged or destroyed units. The completion of planning and design for future needs can be finished within this period and the erection of added facilities will proceed in a pre-determined, orderly manner.

Research laboratory

A plan should also be instituted for the creation of a medical center and research laboratory for the study of tropical diseases and the treatment thereof. Thus can the best medical talents of the Philippines be centered and advanced work performed in conjunction with other research societies throughout the world.

Education

Schools extensively damaged during liberation

The liberation of the Philippines by the American forces and the razed earth policy of the Japanese defenders caused widespread destruction to school buildings and properties as well as to other private and public buildings and property. The few schools left standing were generally extensively damaged and books, laboratory equipment and furnishings were either looted, damaged or destroyed. It has been estimated that approximately 15,000 public and private school buildings were thus affected.

The inclusion of vocational and technical courses in public and private schools has been a recent innovation in the Philippines. However, in spite of the crying need for specialists and technicians, especially in view of the proposed industrialization program, the success of the aforementioned courses has been questionable. The unfavorable factors appear to be the limited scope of the technical courses and fields and the lack of plants and industries wherein in the theoretical knowledge gained may be assured practical application. There is a proposed plan for establishing technical and vocational schools closely allied with the industrial program to partially correct this deficiency.

The United States Department of Commerce has initiated a program whereby prospective foremen, machinists and other technicians from certain South and Central American countries, Mexico and the Philippines are offered extensive technical and practical training in the largest and most modern industrial plants, covering nearly their own countries will bring incalculable benefits.

Public Safety

The Government and semi-official agencies concerned with Public Safety were greatly disorganized by the war and those that have been rehabilitated are operating in many cases with an insufficiency of personnel, material, and coordination. The police and fire departments of Manila, the police departments of certain other cities and municipalities, the Philippine National Red Cross, the safety engineering division of the Department of Labor and the safety division of the US Army are examples of agencies which are actively making progress in public safety. One of their greatest problems is that of traffic law enforcement. Public health organizations are also rising from the shambles of war and although progress is painfully slow, it is being made.

A Philippine Safety Council, under the direction of Major Frank S. Tenny, has been organized and is active in the traffic, police, mine, fire, home and office safety fields. Further expansion, both in scope of service and geographical, is contemplated. This group has as its objective the reduction of accidents and the preservation of life and property in the Philippines. It furnishes leadership and coordination among the existing safety services and creates such services where they do not now exist.

The social and economic value of public safety is beginning to be felt and the safety movement now underway should eventually prove a great factor in the rehabilitation and development of the country.

MISCELLANEOUS AND MINOR INDUSTRIES

This section of the industrial report contains discussion of various miscellaneous as well as minor industries. The inclusion of certain industries of a miscellaneous nature, such as housing, shipyards and drydocks, cottage industries, etc., in this section has not been determined by the relative importance or non-importance of such industries but rather that their inclusion in any other section is not felt desirable.

Miscellaneous Industries

Housing

Housing situation in Manila is acute

The housing situation in Manila today is acute. Two factors, in the main, are responsible for the dire shortage of accomodation prevailing in the city. The destruction caused by the war sent all rents skyrocketing, while the situation was further aggravated by the increasing population

Rash of new houses springing up

With the rash of new buildings springing up on all sides, the shortage has now been alleviated to a great extent and house rents have come tumbling down to nearly half of what they were last year.

Financial assistance is necessary

The creation of a National Housing Commission to prepare, initiate and efficiently conduct a comprehensive program for the reconstruction and construction of homes is believed to possess invaluable merits. However, the program must be adequately supported by financial assistance to the prospective home builders. In this respect it is believed that an efficient National Housing Act and a National Mortgaging Administration may present the most logical and satisfactory solution.

Would serve as guarantee

The initiation of a National Housing Act should provide for the standarization of all construction under existing or revised building codes in compliance with established minimum zonal requirements as to architecture, plans and materials. This Act would necessarily require the support of real estate boards, professional services, contractors, urban planning commissions, financial institutions and legislative bodies. Essentially, this Act would serve to guarantee financial or mortgaging institutions that any home so constructed would have a certain rental or market value at any period of its life.

A national Mortgaging Agency would provide for the underwriting of any home loans made by financial institutions to the extent of 80 to 90 per cent of the actual dwelling cost. The remaining 10 to 20 per cent would constitute the down payment, by the individual, necessary to secure such loan.

The inception of the proposed ideas, co-ordinated with urban plans for sanitation control, adequate transportation and marketing facilities, landscaping, etc., will do much to minimize the undesirable social problems invariably incident to poor housing conditions and will undoubtedly raise physical, mental and moral standards.

Proposed plan is urgently needed

The plan, as proposed, is urgently needed. The difficulty will arise in the financing of such a plan and, unfortunately, the people most in need of the proposed assistance are the ones who can least afford it. Proper housing must be made available at a cost which will enable the average wage earner to finance such housing over a long period of time. Financial assistance and planned guidance must be provided by the government.

However, increase in production on land now cultivated, would not be sufficient to provide for the increasing population nor for the high standard of living which the Filipino people have come to know and demand, and for which they will be able to pay from increased income.

Major project in land settlement is recommended

It is strongly recommended that a major project in land re-settlement be undertaken. Modern mechanized techniques are essential for this proposed scheme which would involve large tracts. As an adjunct to the above project, the present program by NARIC for the extensive production of rice and corn should be encouraged. In addition to this, small scale land settlement projects for diversified farming are also thoroughly recommended.

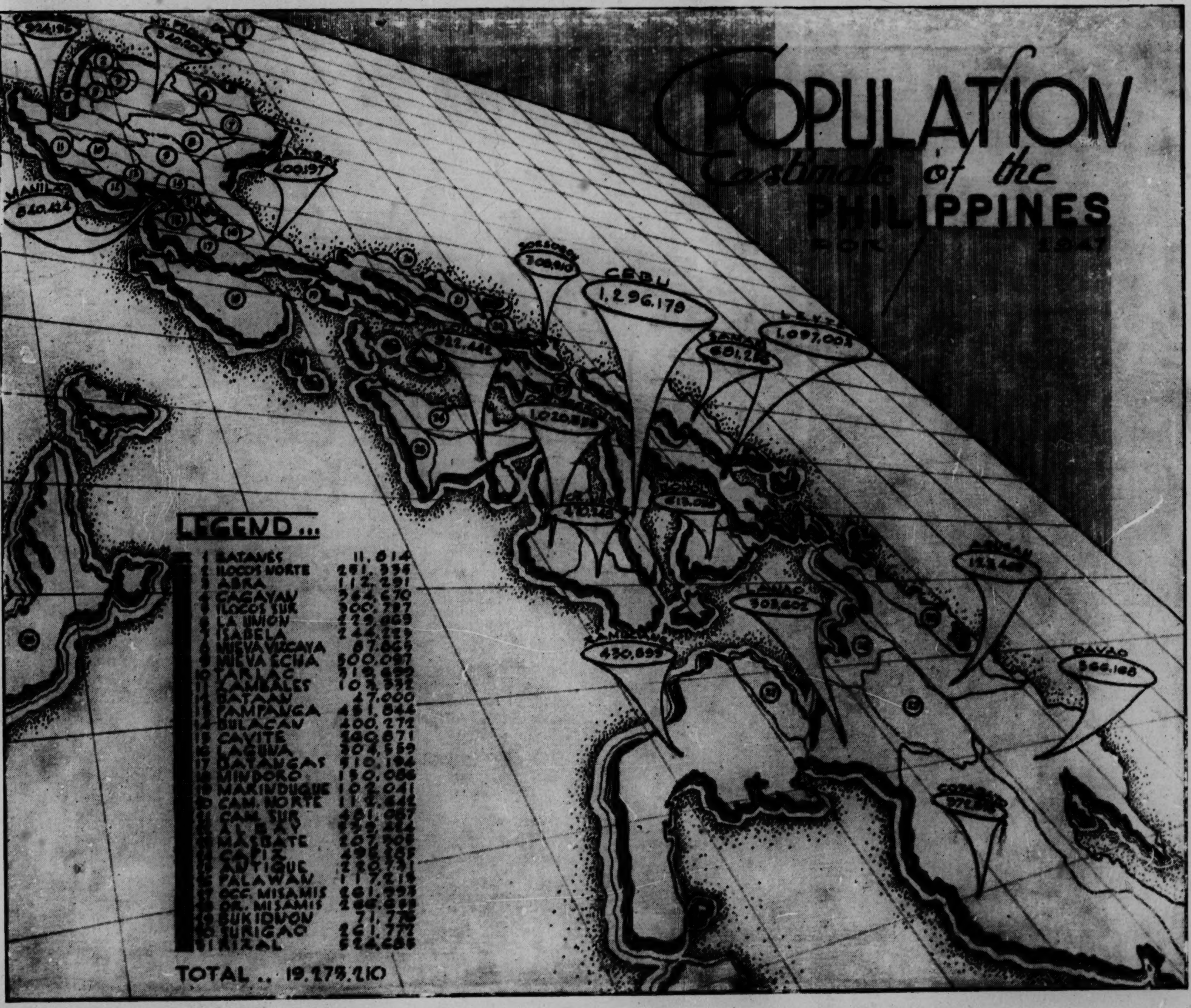
The use of public lands, the construction of roads, and the initial clearing and plowing to be done by this governmental agency are essential elements of this program.

240,000 housing units in next ten years

As a first step in the execution of this project, plans must be formulated which will provide an estimated 240,000 housing units within the next ten years at a unit cost of no more than ₱6,000.

Pre-fabricated housing

The pre-fabrication method of producing low cost homes has facets in design, construction methods and general acceptance by the public. While there is one firm in the Philippines now engaged in the production of this type, the present high cost of production has not been conducive to wide sale to the middle class. Based upon experience in the United States, the development of such a production system is a slow, measured process, and to accomplish



POPULATION Estimate of the PHILIPPINES for 1947

MANILA
840,124
924,196
MT. PROVINCE
340,202
TAYABAS
400,197
SORSOGON
308,810
CEBU
1,296,179
LEYTE
1,097,003
SAMAR
681,2
922,442
1,020,898
213,023
LANAO
303,602
ZAMBOANGA
430,899
AGUSAN
123,469
DAVAO
366,168
COTABATO
372,919

LEGEND...

1	BATANES	11,814
2	ILOCOS NORTE	251,336
3	ABRA	112,291
4	CAGAYAN	364,670
5	ILOCOS SUR	300,787
6	LA UNION	229,069
7	ISABELA	244,229
8	NUEVA VIZCAYA	87,069
9	NUEVA ECIJA	500,097
10	TARLAC	319,699
11	ZAMBALES	103,332
12	BATAAN	47,000
13	PAMPANGA	451,844
14	BULACAN	400,272
15	CAVITE	260,871
16	LAGUNA	304,559
17	BATANGAS	510,194
18	MINDORO	150,086
19	MARINDUQUE	102,041
20	CAM. NORTE	112,642
21	CAM. SUR	481,987
22	ALBAY	539,284
23	MASBATE	207,908
24	CAPIZ	495,395
25	ANTIQUE	230,731
26	PALAWAN	117,219
27	OCC. MISAMIS	261,993
28	OR. MISAMIS	266,898
29	BUKIDNON	71,776
30	SURIGAO	261,777
31	RIZAL	624,686

TOTAL .. 19,273,210

the end results, severity of design and appointments must be considered, although the prevailing climatic condition lends itself to the evolution of an architectural style based on native character and materials combined with functional traits of modern architecture. The simplicity of such an evolved style is further enhanced and can be indicated by large window areas required to afford maximum ventilation and minimum wall surfaces.

Basic problem

As mentioned, the choice of a fabrication system remains the basic problem and the solution usually trends towards the following:

1. Panelled construction by which the main frame is cut and assembled in the shop.
2. Pre-cut members for assembly in the field with structural members such as trusses confined to the shop.
3. Team operations in the field whereby concrete slabs or foundations, kitchen and bath installations, precut frame assembly, and exterior and interior finish are generally placed in the order named.
4. In all cases door and window units are manufactured in the shop.

Situation leads to wasteful practices

The selection of any basic system as outlined above is also predicated on the availability of building materials manufactured to a modular dimension. One notable example is the fact that the Philippines has as standard of measure the metric system and yet production of finished lumber products is based on feet and inches. Obviously this situation leads to wasteful practices even in custom-built housing, and should be corrected on general principles for greater efficiency in construction.

Excessive competition can lead to failures

Considering the extensive housing program previously recommended and the tendency for the construction of custom-designed and built houses, the success of a pre-fabricated house plant will only be measured by the public's acceptance of simply designed units at established prices. Excessive competition can easily lead to failures in this field. For this reason one plant is recommended, the productive rate of which should be initially established at 3,000 houses per year until the market warrants expansion. It is estimated that a total capitalization of ₱1,000,000 will be required.

Shipyards and Drydocks

Prior to the war, no shipyard or ship repair facilities existed for vessels above the 3,000 tons class. As a result all vessels of this class had to proceed or to be towed to Hongkong, Java or other foreign ports for repair. For vessels of under 3,000 tons, only inadequate Government and private repair facilities existed.

In view of the proposed industrialization program of the Philippines whereby raw materials for the construction and repair of large vessels may be made readily available, and the increase in shipping and trade incident to such industrialization, it is felt that the establishment of shipyards and ship repair facilities will be in the best interests of national economy.

Best interests of national economy

The establishment of this industry will serve to replace the inadequate Government and private shipyard facilities which were almost entirely destroyed by the war and have not been rehabilitated to any great extent. This industry will also free the Philippines shipping fleet from dependence on a foreign source of supply and will enable the Philippines to develop an export market. This industry while utilizing sizable quantities of products of the proposed heavy industries, will provide a means of livelihood for a large number of people and will insure a substantial source of Government revenue.

Four graving docks would be suitable

Experts have estimated that four ten-thousand ton graving docks of approximately 600 feet x 90 feet, six building yards suitable for construction of vessels between 5,000 to 10,000 tons load displacement, six marine slipways to accommodate vessels of 1,000 to 3,000 tons load displacement, plus all auxiliary and shop equipment, would be suitable for Philippine requirements.

Unless the equipment for the establishment of this industry is secured as part of ad-interim reparations, the capital required would prevent the undertaking of this project for some years. For this reason, a financial investigation is made of the project only on the basis of receiving this equipment as part of the Japanese reparations. Predicated on these facts, the following financial investigation is submitted:

Total Capitalization		₱46,100,000
Total Yearly Operation Costs		24,920,000
Estimated Yield: ,		
Gross Sales	₱30,000,000	
Less operating Costs	24,920,000	
Net Profit	5,080,000	

Cottage Industries

There is no doubt that many skillfully made articles of handicraft are produced throughout the Philippines. The Filipino people are, in general, gifted with patience, dexterity, an eager and alert mind, an inherent artistic sense and an appreciation of beauty in form, line and color. These qualities are important in the production of fine handicraft articles.

Appreciation of beauty

The Philippines occupies a favorable position in respect to the marketing of handicraft articles for the following reasons:

1. The American market is distinctly friendly, not only because of old ties, but because other labor markets of the world are so unstable that buyers are hesitant to resume trade with them.
2. The Philippines enjoys the advantage of free trade with the United States
3. The United States is one of the few countries in the world whose people are in a financial position to purchase handicraft and non-essential ornamental articles in substantial quantities.

In general, it may be said that the majority of handicraft articles now being produced are not properly designed to appeal to the broad market, that their prohibitive prices further decrease the existent, if limited, market potential and that the lack of an organized marketing procedure prohibits adequate and successful coverage. A discussion of the considerations follows herewith.

Not designed to appeal to broad market

Some years ago, the Home Industry Section of the Bureau of Education accomplished much in the development of cottage industries. This section or group, composed of craftsmen, travelling teachers, draftsmen, artists and supervisors, was so organized as to quite adequately cover the Philippines and to direct the then existent program in such a manner as to insure that the products fabricated met certain specifications as to design, materials and workmanship, prime requisites for exportable articles.

In addition to the Home Industry Section of the Bureau of Education, there existed an industrial museum for the study of industrial plants and plant products and a school of household industries for women.

In order to restore the Home Industry activities of the Bureau of Education to its former flourishing status, it will be necessary to recall all available former craftsmen and teachers and to train required additional personnel. It is highly recommended that this program be re-instituted for it has been conclusively proven that a laissez faire and unorganized method of developing home crafts and industries will not succeed on a commer-

Laissez faire attitude will not succeed cial scale. Countries which export large quantities such as Japan, Mexico, Czechoslovakia and Switzerland, have well established organizations, supplemented by extension work, to sustain their handicraft industries. An analysis of the Philippine program indicates that an estimated fund of ₱200,000 per year would be initially required.

Factors governing reduction of costs

The reduction of production costs will rest almost entirely upon the introduction of standardized designs, assembly line procedures, combination of parallel crafts and the introduction of semi-mechanization to the industry.

The reduction of marketing costs may be accomplished by the elimination of the great number of middlemen who individually or collectively often realize more profits than the actual producer of the original products. It is believed that collective marketing procedure can be super-imposed upon the Home Industry section for wider coverage and upon the National Development Company sales organization for an outlet for market advantages. It is contemplated that this procedure would be instituted as follows:

1. That sample products judged most saleable be forwarded to the National Development Company through or at the instigation of the Home Industry Section field branches.
2. That these samples be forwarded to a central sales office in the United States, and possibly other countries, for display to prospective buyers.
3. In the event of non-acceptance, probably because of design, material, workmanship or price reasons, suggested changes will be recorded and incorporated into new designs, etc., suitable to the buyers. At this point a pre-determined sales price will be established and all data will be forwarded to the National Development Company.
4. Upon receipt by the National Development Company of all data, this information will be discussed with the various manufacturers, through the Home Industry section, and new samples incorporating the suggested changes will be made up and forwarded to buyers for final approval.

Depends on how following problems are going to be met

It may be said that the success of the cottage industry program will depend largely upon how efficiently the following problems are met:

1. Organization
2. Training program
3. Quality, design and cost of final product

4. Material and production costs
5. Volume

The following items: embroidery, abaca rugs, rattan furniture, basketware, woodcarvings, metal craft products and hand-woven textiles, are listed in general order of their availability and importance and are discussed separately in the following pages.

Embroidery Work

Philippine embroidery work was produced and exported in large quantities prior to the war, particularly in the form of infants' wear, women's underwear and table linens. This embroidery work was of excellent quality and workmanship and was available at reasonable prices.

Excellent quality and workmanship

At the present time, these items are just beginning to be produced in quantity. An obvious reason for the apparent delay in resuming production is the high cost and lack of proper raw materials and equipment normally imported from the United States. Also, due to these incident high costs, the sales price of the finished products are beyond the financial reach of the average American consumer. It is possible that by the introduction of simplified design and the use of imported raw materials a finished product of merit may be made available at reasonable cost.

It is recommended that a survey be made of the Philippine firms now engaged in the industry or desirous of being engaged in the industry and that the most promising, experienced and capable of these be selected to receive required assistance for the resumption of operations.

Recommended that a survey be made

Rattan Furniture

Although the production of rattan furniture has been discussed previously in this report and there are factories now producing in considerable quantity, because of the hand work involved it is felt that this item can be properly classified as a cottage industry.

At the present time, rattan furniture is being exported in limited quantities, possibly due to the localized demand in the United States but more probably because of present prohibitive selling prices. For this reason steps must be taken to drastically reduce production costs and selling prices. The following recommendations are made:

Steps must be taken to reduce prices

1. That rattan products be re-designed, particularly for size and "knock-down" possibilities in order that shipping costs may be reduced.

2. That semi-mechanization of some processes be introduced, where possible.
3. That quality control be established.

Abaca Rugs

Re-established on a modest scale

The abaca rug manufacturing industry has been re-established on a modest scale and small quantities of rugs are being produced and exported. However, prices are considerably higher than pre-war and sales have been retarded as a consequence.

Philippine abaca rugs contain superior workmanship, style and design as compared to similar American products. However, as mentioned, their high prices do not enable them to compete favorably with American products.

Basketware

Have little except souvenir value

Excellent Philippine hand woven basketware is produced in great quantity in many parts of the islands. But the majority of the basketware articles are designed for domestic markets and, as such have little except souvenir value in American or world markets.

The re-design of the majority of basketware articles for which a foreign demand may be developed and the retention of the inherent workmanship and quality of the articles produced will enabie this handicraft industry to expand and prosper.

Woodcarving

Primitive or semi-primitive art at its best

Woodcarving in the Philippines, especially that done by the Igorots in Luzon, exemplifies primitive or semi-primitive art at its best. However, the subject matter of the majority of the articles produced places them in the category or light items, souvenirs, etc., and thus precludes the possibility of sizable export volume. Further, because of the tremendous amount of tedious hand work involved, the price of these articles greatly restricts their sale in the volume market.

The re-design of subject matter and the incorporation of this craft with others would greatly increase acceptance, and the introduction of pantographic carving equipment for rough carving prior to hand finishing will greatly reduce unit costs.

Metal Craft

Outmoded design

The great majority of the metal craft produced in the form of costume jewelry, filigree work, etc., is of outmoded design although the workmanship contained therein is definitely outstanding. Also, the majority of the items are unnecessarily heavy and bulky in size. Production is limited and costs are high due to the enormous amount of hand work involved.

The successful expansion of this industry will depend upon the the re-design of products for universal appeal and the extensive use of production machinery to decrease production costs and sales price.

Expansion will depend on re-design

Handwoven Textiles

Philippine hand woven textiles are very attractive in appearance and possess definite sales possibilities. However, the use of improperly designed and fitted looms produces large loops in the weave of these textiles. These large loops are prone to be caught and pulled out of place, thereby destroying the design, leaving loose ends and precipitating excess ravelling. Further, a great many of the dyes used are not fast, resulting in a product the colors of which will fade and run.

Large loops are prone to be caught

It is recommended that small Jacquard hand looms be procured to replace the looms now in use. Not only will the Jacquard loom produce a much finer and precise weave but it is adaptable to the production of more varied designs than are possible with the looms now employed. The training program which would be required to teach the technique of use of this type loom need not be expansive nor of long duration.

Small Jacquard looms recommended

Minor Industries

Button Manufacturing

Prior to the war, there were four factories engaged in the manufacture of buttons from mother-of-pearl shells. The average annual production of buttons has been estimated at approximately 1,000,000 gross of buttons, valued at ₱500,000.

The mother-of-pearl shells from which buttons are manufactured are produced as a by-product of the pearl fishing industry, which is carried on in the vicinity of the islands of Tanbilaongan, Pasigan and Calapag in Sulu, and the Durwaran islands of Northern Palawan.

At the present time, there is a shortage of mother-of-pearl shells due to indirect war results such as dislocation of economy, displacement of personnel, loss or damage to equipment, transportation difficulties, high labor costs, etc. It is felt that the introduction of scientific methods of pearl fishing is necessary if adequate raw materials are to be furnished this industry. Production will naturally be determined by the amount of raw materials made available.

Shortage of mother-of-pearl

Sheet glass

Average imports of sheet glass to the Philippines in pre-war years amounted to approximately 130 metric tons.

Silica sand is available in Mindoro

Although all necessary raw materials for the manufacture of sheet glass are not available, the possible receipt of reparations equipment from Japan for the proposed chemical industries will provide for the manufacture of the ingredients soda ash and salt cake. Limestone and feldspar, other essential raw materials, are available locally in deposits located in the provinces of Rizal, Batangas and Quezon. Silica sand is available in Mindoro.

It is recommended that a sheet glass pilot plant of 1,000 pounds per day capacity be initially installed for experimental and limited production purposes. An estimated capitalization of ₱150,000 will be required.

Assembly plants

Take advantage of lower rates

The establishment of plants for the assembly of automobiles, bicycles, miscellaneous machinery, electrical motors and appliances and the other products whose final assembly need not be confined to factories is felt to be sound. Not only may advantage of lower rates be taken but shipping costs may be reduced as well. The assembly of articles for local consumption and for Asian distribution will undoubtedly effect considerable savings to producers as well as consumers.

Inasmuch as capitalization will depend upon the product and scale of operations, no estimate thereof is made.

Agro-Industrial Development

Incentives for the worker are necessary

As noted on page 230, a strong recommendation was made for the furtherance of a land re-settlement project. This movement as envisioned by the Land Resettlement Act was aimed fundamentally at stimulating a population shift to the undeveloped areas of the country, whereby population pressure would be relieved in the congested urban centers. However, this discussion revolves around the necessary incentives that must be provided to the worker or prospective settler in order to accomplish the end results.

The impetus towards establishing a new frontier can hinge around a basic law of the land which in essence may limit full scale development of virgin areas by private capital. It must be appreciated that the reason behind the provisions is to safeguard the national patrimony which the land constitutes, so as to secure its adequacy to the increasing number of small farmers. But the following two points contain some basis for thought and are solely presented as background material:

1. That the character of the land and the soil which is suitable for the cultivation of the economic perennial plants of the tropics is seldom—if ever—suitable to the needs of the small farmer. Its characteristics could only produce small farms of marginal character which would hardly sustain the small farmer or his family.
2. It is possible to frame a form of lease that would guarantee the national patrimony and still attract the person willing to invest his money on a long term basis.

Basis for thought

Referring to the Philippine land laws, the interesting feature of the Act is the stipulation on an individual or corporation which prohibits the holding of more than 1,2000 hectares of land in the Philippines. There is no pretension advanced that 1,200 hectares is too small an area on which to incorporate an enterprise for the cultivation of rubber, tea or cinchona. Ninety per cent of such incorporations in British Malaya, Ceylon and Indonesia were founded on areas less important than 1,200 hectares. The facts outlined in the subsequent paragraph but one demonstrate that the investment in such undertaking was that of venture capital seeking long term appreciation rather than immediate return; the limitation upon the amount of land that an individual investor or shareholder in a corporation may hold inhibits this expectation and drives him to seek opportunity where this restriction does not exist, and where the profits derived from the first block of land can be plowed back into the extension of his holdings.

The character of such investment is that of a venture investment for people who can afford (1) to wait long periods for return and (2) to take long risks on the return. Such capital is not invested at bankers' interest rates but is largely made for the chance of capital appreciation as represented by the enhanced value of the plantation during the period of its full production, and also by the opportunity to plow back profits by expanding the individual or corporate holdings.

From the point of presentation in this discussion, the stand of capital investment in the growing of crops which are harvested from perennial plants such as rubber, tea, coffee, chinchona, palm oil, etc. warrants clarification.

Needs clarification

The growing of these crops and their processing to the stage where they can be sold, are agrico-industrial operations rather than purely agricultural ones. They not only require investment in the clearing of the land, planting and maintenance for a period of from six to nine years until the trees or shrubs reach the first stages of production, as well as several more years between that stage and the one at which full production may be expected (which may be as long as fifteen years after planting) but they also require—if high quality products are to be derived—considerable investment in processing plant. This last investment varies considerably with the product grown but cost during the decade immediately preceding the recent war.

Varieties considerably with the product that is grown

Rubber A fair estimate of the cost of the processing equipment for the production of first class rubber smoked sheet or fine pale crepe, including motive power, machinery and drying equipment was ₱80.00 per planted acre with an economic minimum of about 1,000 acres.

Tea A tea factory adequate to take care of the average production from 80 to 1,000 hectares of tea garden involved a capital outlay of around ₱400,000.

Cinchona The processing plant on a plantation of 700 to 1,000 hectares of cinchona cost not less than ₱400,000.

Oil Palm (Elias guiensis). For a plantation of 2,500 hectares which was considered the smallest economic unit, the equipment necessary to process both the oil from the pericarp of the fruit and that from the kernels cost about ₱2,500,000.

The above is all equipment which can only be amortized over periods of operation extending from 25 to 30 years, if the products coming from them are to carry a cost which is in relation to the average market price which they would fetch over a similar period.

As stated above, the investment in the plantations where these products are grown is a long term one, subject to a lengthy waiting period from the time the land is cleared until the first productive stage, after which the yields gradually increase year by year until the plants attain full maturity. This mature production continues for a period of years and is then followed by the gradual senility of the crop plants. Rough figures for the crops mentioned above would be about as follows:

•Subject to long waiting period

Rubber. Non-productive stage, including time to clear, prepare land for plantting, planting, bud grafting and maintenance .... from 6 to 7 years

Juvenile period, first crop in 7th or 8th year, which will be about 25% of that which may be expected at maturity and increasing years by from 10 to 15%	from 8 years
Mature period, when trees will be fully productive	from 15 to 20 years
The senile stage will run from	30 to 40 years
and production may be prolonged if the price of rubber remains at a fair level and labor does not become too expensive for a further seven or eight years before the yields become so low as to necessitate replanting.	

Cycle may become somewhat distorted

This cycle has become somewhat distorted due to the development of high yielding strains of rubber. It has often paid estates to chop out areas long before they have reached senility and replace them with the high-yielding plant material. This is especially true during periods of over-supply when the production of individual estates becomes subject to quotas varying from 60 to 75 per cent, of their rated capacity. In such periods, many estates replanted up to 10 per cent of their acreage each year.

Tea The work preparatory to planting tea is much more onerous than is the case for rubber, but the immature period is only three and a half years from the time the bushes are set out. The juvenile period—that is, the time from first to full production—is much longer than in the case of rubber. It may stretch over a period of 20 years. The mature life of the tea plant is also much longer than that of rubber; it may extend to 50 years, and plantings 70 years old which still produce profitable crops are not unknown.

Cinchona The harvesting of cinchona bark involves the entire removal of the plant. This is done by a process of thinning out the plantation and dependence upon the fact that at each harvest the removal of a fewer number of larger trees will maintain a satisfactory yield of bark.

The non-productive period of growth from the time the root stock has been bud-grafted with high yielding top stock is seven years; the period between the planting out of the seedlings for root stock and top grafting is two years. Add a year for the preparation of the land, and the non-productive period covers a stretch of 10 years.

The first years' harvests, say from the eleventh to the fifteenth years, involve the removal, decortication and preparation of enough trees to give growing space to the more promising stand. The harvests during this period are not large. The economic life of the plantation will be from 25 to 30 years from the first year of bearing.

Palm Oil The Elias Guiensis will begin to produce racemes of fruit in the fifth year after the trees have been transplanted from the nursery but these racemes are small and fine and both the pericarp and kernel oil contents will be low. The harvests will increase year by year until about the twelfth year, when the increase levels off. The mature life cycle is about 25 to 30 years and after this period, it becomes necessary to replant.

Period is too short

The above facts demonstrate that, insofar as perennial plantations are concerned, the part of the Philippine Land Laws which limits the length of a lease to a period of 25 years constitutes a problem because the period is too short to permit the investor to amortize the capital he invests in the plantation and at the same time obtain a reasonable average yearly return or profit from such investment. This is, of course, further emphasized when it is considered that the communities from such plantations are subject to violent price fluctuations and consequent periods when, in order to maintain the estates, it becomes necessary to sacrifice the amortization of capital for one or more years.

Furthermore, it will be noted that the year of the expiration of the lease would be in the middle of the period of the highest return, quantitatively, of the plantation and few people are so unselfish as to entertain investing money in a property of which they would lose the use at the peak of its productivity.

Great cost of equipment

In the case of palm oil, the great cost of the processing equipment of economic type definitely debars consideration of the 1,200 hectares plantation. It is doubtful whether the initial investor would be attracted by the opportunity to plant less than 5,000 hectares to this crop although, after the first unit had come into existence, investors on a smaller scale might be attracted to take up areas contiguous to the original one if they could be sure that their crops would be processed at the mill of the original unit.

In this last connection, it should be pointed out that the existence of the large plantation has been the means of attracting population from overpopulated areas to those undeveloped areas. Their requirements for labor are fairly steady the year round and invariably they can afford higher wages than those prevalent in the congested districts from which such labor is attracted. Furthermore, the buying power which is created in sections where plantations occur attracts people to come and serve the area either by trade or by developing farms for the production of foodstuffs on the richer alluvial lands contiguous to the plantations. Whole districts have been known to develop by the innoculant properties, natural to well managed and soundly financed plantations, which have created much prosperity for the people domiciled around them, many of whom originally came to such areas as plantation labor and who remained, after their labor contracts expired, to become land owners for their own account.

Requirements for labor are fairly steady

Many such have not taken to the growing of foodstuffs but have planted for themselves small areas of the crops they have learned to cultivate and harvest while employed on the plantation and depending upon the modern equipment of the plantation for the processing of their crops into commodities of a higher quality than they could produce themselves with primitive tools. In many instances, the plantation has stimulated this by assisting sound ex-employees financially and by making superior plant material available to them, as well as helping them in the selection of their lands. This is particularly the case with rubber and tea.

Particularly the case with rubber and tea

It must be clearly understood that the above is not written in a spirit of criticism of the Philippine Land Laws in any way. It has been written to explain why the huge investment in the clearing and planting of economical perennial crops since the first decade of this century has by-passed the Philippines which, from soil and climatic conditions, offer all the advantages afforded in the countries where this investment was made.

Explanation not criticism

It may also serve in making suggestions and recommendations to the Philippine Government in the event their program to attract the investment of foreign capital to the Philippines includes investment in the development of the land as well as that of industry.

Outside capital will only become interested if it can invest on a large scale and if the acceptance of long deferred return is coincident with the opportunity of capital appreciation through expansion. At the present time, there are large blocks of American money seeking investment for deferred return. This can be classed

Outside capital only interested in large scale investments

"Seeking to escape taxes"

as capital "seeking to escape taxes". Its objective is to seek to make up for the sacrifice of immediate returns through the enhancement of the value of the investment. Attracting this capital without permanently alienating the land, is a problem that will bear serious consideration.

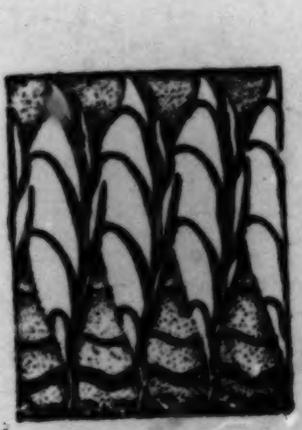
CONCLUSION

It is obvious that the industrialization of any country will bring to mind introduction of many secondary industries for the production of goods or services. The establishment of many of these industries may be made possible only through and because of such industrialization.

Inasmuch as the majority of these industries will be developed wholly by private enterprise it is not felt that undue thought or effort is necessary to encourage their establishment except where such is necessary for the advancement of national economy.

The one fundamental that cannot be overlooked is the fact that the people themselves will benefit by the establishment of new industries. This increased purchasing power will open new domestic as well as foreign markets in which the products of smaller crafts together with those of minor and major industries will find ready acceptance.

This proposed program is not for the exploitation, but for the betterment of the people as a whole.



Part IV

Appendices

TABLE I — Showing the provinces having the heaviest stand of timber by group of species 40 cm. and above in diameter.

PROVINCES	*First Group Cubic Meters*	*Second Group Cubic Meters*	*Third Group Cubic Meters*	*Fourth Group Cubic Meters*	*TOTAL Cubic Meters*
1. Cotabato	65,437,300	59,276,260	14,409,090	20,093,740	159,216,890
2. Zamboanga	4,538,030	59,959,780	44,775,240	3,820,730	113,093,780
3. Davao	15,283,150	20,234,180	39,373,690	17,473,680	92,364,700
4. Agusan	2,889,050	44,507,960	34,283,440	1,718,030	83,398,480
5. Samar	8,760,470	32,103,540	25,169,790	11,675,440	77,709,240
6. Lanao	6,300,320	37,642,170	26,254,810	3,836,580	74,033,880
7. Surigao	9,831,310	44,595,990	6,561,240	6,482,950	67,471,490
8. Quezon (Tayabas)	5,425,300	40,308,490	4,987,620	173,040	50,894,450
9. Palawan	10,932,440	12,936,820	4,603,430	18,782,010	47,254,700
10. Negros Occidental	867,350	24,684,650	13,339,980	1,828,350	40,720,330
11. Isabela	10,484,580	18,945,870	8,724,320	2,310,570	40,465,340
12. Mt. Province	3,594,770	35,148,930	1,198,260		39,941,960
13. Nueva Vizcaya	12,978,370	7,888,960	3,674,160	9,893,020	34,434,510
14. Cagayan	2,389,480	25,016,450	3,564,310	2,216,920	33,187,160
15. Mindoro	6,653,240	18,245,000	5,393,580	2,975,250	30,267,070
16. Negros Oriental	1,395,230	13,457,690	10,901,920	5,527,610	31,282,450
17. Bukidnon	1,962,510	8,289,900	13,581,250	5,678,040	29,511,700
18. Leyte	5,438,160	13,384,100	6,493,310	2,284,430	27,650,000
19. Misamis Oriental	1,741,880	16,887,350	6,741,280	892,350	26,262,860
20. Camarines Sur	1,548,960	10,081,210	4,570,110	1,449,950	17,645,280
21. Camarines Norte	1,398,000	10,804,020	4,614,120	589,430	17,405,570
22. Zambales	3,345,400	5,529,800	1,287,700	1,905,630	12,068,530
23. Nueva Ecija	2,555,950	5,817,440	2,204,770	81,830	10,609,990
24. Misamis Occidental	912,360	4,919,610	2,184,350	734,790	8,751,110
TOTAL	183,708,610	570,666,170	288,891,770	122,874,370	1,165,640,920

TABLE II — Showing the provinces, Area of Commercial Forest, and Stand of Timber.

PROVINCES	*Area of Com. Forest Hectares*	*Stand in cu. m. 40 cm. to 70 cm. in diameter*	*Stand in cu. m. 70 cm. and above in diameter*	*TOTAL Stand in cu. m.*
1. Cotabato	1,212,800	57,317,900	101,898,490	159,216,390
2. Zamboanga	1,143,160	27,142,510	85,951,270	113,093,780
3. Davao	938,560	38,793,170	53,571,530	92,364,700
4. Agusan	930,300	25,019,540	58,378,940	83,398,480
5. Samar	916,186	31,860,790	45,848,450	77,709,240
6. Lanao	532,120	16,287,450	57,746,430	74,033,880
7. Surigao	545,030	20,241,450	47,230,040	67,471,490
8. Quezon	516,550	26,465,110	24,429,340	50,894,450
9. Palawan	1,050,190	37,803,760	9,450,940	47,254,700
10. Negros Occidental	295,525	15,473,730	25,246,600	40,720,330
11. Isabela	579,586	27,516,540	12,948,800	40,465,340
12. Mt. Province	717,735	20,370,400	19,571,460	39,941,960
13. Nueva Vizcaya	622,040	17,561,600	16,872,910	34,434,510
14. Cagayan	420,526	6,969,300	26,217,860	33,187,160
15. Mindoro	359,370	16,949,560	13,317,510	30,267,070
16. Negros Oriental	217,210	7,194,960	24,087,490	31,282,450
17. Bukidnon	384,480	10,329,090	19,182,610	29,511,700
18. Leyte	278,270	19,908,000	7,742,000	27,650,000
19. Misamis Oriental	166,760	13,394,060	12,868,800	26,262,860
20. Camarines Sur	164,570	10,057,790	7,587,440	17,645,230
21. Camarines Norte	117,370	6,266,010	11,139,560	17,405,570
22. Zambales	170,790	4,344,670	7,723,860	12,068,530
23. Nueva Ecija	124,470	6,578,190	4,031,800	10,609,990
24. Misamis Occidental	94,120	4,463,070	4,288,040	8,751,110
TOTAL	12,497,718	468,308,650	697,332,270	1,165,640,920

TABLE III — Showing the species of the largest volume in each of the provinces, arranged according to the total stand.

Species	*Volume in Cu. Meters*	*Total Stand Per cent*
COTOBATO		
Yakal	24,105,360	15.13
Apitong	20,698,130	13.00
Guijo	20,682,210	12.98
Manggachapui	18,883,060	11.85
Red Lauan	16,001,250	10.05
Tangile	11,941,230	7.50
White Lauan	10,380,910	6.52
Mayapis	6,400,500	4.02
Batete	4,028,180	2.53
TOTAL	133,120,830	83.58
ZAMBOANGA		
White Lauan	38,044,520	33.65
Mayapis	27,838,870	24.56
Apitong	13,617,090	12.04
Tangile	8,463,260	7.45
Red Lauan	8,074,060	7.36
Kalunti	3,114,830	2.77
Guijo	3,022,170	2.69
Almon	1,495,760	1.33
TOTAL	103,670,560	91.85
DAVAO		
White Lauan	31,621,170	34.24
Guijo	9,046,720	9.78
Tangile	5,473,500	5.93
Bagtikan	4,589,210	4.97
Yakal	3,728,970	4.04
Red Lauan	3,169,880	3.43
Manggasinoro	3,013,570	3.27
Apitong	3,000,990	3.25
Palosapis	2,958,910	3.20
Mayapis	2,423,860	2.62
TOTAL	69,026,780	74.63
AGUSAN		
White Lauan	28,823,830	34.56
Apitong	15,294,870	18.34
Mayapis	11,694,120	14.02
Red Lauan	9,939,090	11.91
Tangile	5,183,300	6.21
Lanipau	2,248,390	2.70
Dagang	1,244,820	1.49
Narra	1,169,000	1.40
Bagtikan	1,089,030	1.31
Almon	1,075,240	1.29
TOTAL	77,761,690	93.23

TABLE III — (Continued)

Species	*Volume in Cu. Meters*	*Per cent Total Stand*
SAMAR		
White Lauan	21,329,810	27.43
Apitong	12,662,630	16.29
Tangile	6,832,690	8.79
Mayapis	6,296,340	8.10
Toog	3,218,130	4.14
Yakal	2,953,840	3.80
Red Lauan	2,233,150	2.87
Guijo	2,215,380	2.85
Manggasinoro	1,484,690	1.91
Narra	1,103,800	1.42
Makaasim	886,150	1.14
Almaciga	738,460	.95
TOTAL	61,955,070	79.69
LANAO		
White Lauan	21,300,760	28.85
Mayapis	16,101,950	21.67
Tangile	8,636,310	11.68
Apitong	5,294,590	7.16
Red Lauan	3,772,730	5.10
Guijo	2,687,210	3.63
Almon	2,250,870	3.03
Bagtikan	1,942,240	2.61
TOTAL	61,986,660	83.73
SURIGAO		
Apitong	12,583,870	18.65
Tangile	12,474,030	18.49
Mayapis	8,501,520	12.61
White Lauan	6,018,580	8.94
Red Lauan	5,862,760	8.69
Yakal	3,141,000	4.66
Eugenia Spp.	2,370,970	3.51
Duyok-duyok	1,648,100	2.44
Mankono	1,583,420	2.35
TOTAL	54,184,250	80.34
QUEZON		
Mayapis	15,909,460	31.26
Red Lauan	11,787,040	23.16
Tangile	9,171,090	18.02
White Lauan	2,865,330	5.63
Bagtikan	1,893,260	3.72
Dao	1,847,450	3.63
Apitong	1,822,000	3.58
TOTAL	45,295,630	89.00

TABLE III — (Continued)

Species	Volume in Cu. Meters	Per cent Total Stand
PALAWAN		
Ipil	5,207,780	11.04
Malugai	4,173,780	8.83
Apitong	3,602,480	7.63
Amugis	2,308,800	2.89
Maranggo	1,798,880	3.82
Nato	1,543,920	3.27
Bogo	1,208,700	2.57
Taluto	1,194,530	2.53
Bangkal	1,076,500	2.28
TOTAL	22,115,370	46.86
NEGROS OCCIDENTAL		
Tangile	11,198,090	27.51
Red Lauan	10,917,120	26.82
Almon	8,213,290	20.15
Bagtikan	4,181,980	10.25
Apitong	1,168,670	2.87
Yellow Lanutan	1,058,730	2.60
White Lauan	700,390	1.71
Eugenia Spp.	647,450	1.50
TOTAL	38,085,720	93.41
ISABELA		
Apitong	14,502,770	35.84
White Lauan	7,813,850	19.31
Narra	5,203,840	12.86
Guijo	4,649,460	11.50
Red Lauan	1,740,000	4.29
Mayapis	975,210	2.41
Tangile or Tiaong	724,330	1.80
TOTAL	35,609,460	88.01
MT. PROVINCE		
Pine Benguet	28,358,790	71.00
Apitong	1,997,100	5.00
Guijo	1,597,680	4.00
Palosapis	1,597,680	4.00
White Lauan	1,198,260	3.00
Tangile	1,198,260	3.00
Red Lauan	1,198,260	3.00
Narra	1,198,250	3.00
TOTAL	38,344,280	96.00
NUEVA VISCAYA		
Guijo	4,658,990	13.53
White Lauan	3,019,900	8.77
Narra	2,510,270	7.29
Yakal	1,873,240	5.44
Apitong	1,463,470	4.25
Manggachapui	1,198,320	3.48
Makaasim	1,122,560	3.26
Dao	1,026,150	2.98
TOTAL	16,872,900	49.00

TABLE III — (Continued)

Species	*Volume in Cu. Meters*	*Per cent Total Stand*
CAGAYAN		
Red Lauan	9,302,370	28.04
Apitong	8,535,750	25.72
White Lauan	3,381,780	10.19
Tangile	2,764,490	8.33
Mayapis	1,964,680	5.92
Palosapis	1,523,230	4.59
Narra	909,330	2.74
Guijo	637,200	1.93
Nato	315,280	.95
Dungon	278,770	.84
Ipil	278,770	.84
TOTAL	29,891,650	90.09
MINDORO		
Tangile	5,218,040	17.24
Apitong	3,849,970	12.72
White Lauan	3,759,170	12.42
Mayapis	3,317,270	10.96
Palosapis	2,291,220	5.57
Guijo	2,070,270	6.84
Malugai	1,852,350	6.12
TOTAL	22,358,290	71.87
NEGROS ORIENTAL		
White Lauan	9,541,130	30.50
Red Lauan	4,955,130	15.83
Apitong	4,636,050	14.81
Tangile	2,493,210	7.96
Bagtikan	691,340	2.21
Guijo	685,090	2.19
Amugis	444,210	1.49
TOTAL	23,446,160	74.99
BUKIDNON		
White Lauan	11,220,320	38.02
Red Lauan	2,186,810	7.41
Oak	1,814,970	6.15
Tangile	1,643,870	5.57
Apitong	1,266,050	4.29
Lumbayan	1,059,470	3.59
Mayapis	1,029,960	3.49
TOTAL	20,221,450	68.52
LEYTE		
White Lauan	6,050,260	21.88
Red Lauan	5,407,850	19.56
Guijo	3,403,100	12.31
Apitong	3,228,650	11.68
Tangile	2,029,680	7.34
Yakal	1,630,940	5.90
Mayapis	993,150	3.59
Nato	830,700	3.01
Malugai	337,820	1.22
Molave	276,900	1.00
TOTAL	24,189,050	87.49

TABLE III — (Continued)

Species	Volume in Cu. Meters	Per cent Total Stand
ORIENTAL MISAMIS		
Tangile	9,765,700	37.18
White Lauan	6,195,280	23.59
Mayapis	4,138,940	15.76
Red Lauan	2,681,740	10.21
Almaciga	1,238,750	4.72
Narig	391,280	1.49
Oak	379,470	1.45
TOTAL	24,791,160	94.40
CAMARINES SUR		
Apitong	6,376,970	36.14
White Lauan	4,144,860	23.49
Red Lauan	1,515,720	8.59
Tangile or Tiaong	603,470	3.42
Dungon	400,550	2.28
Yakal	382,900	2.17
Taluto	338,790	1.93
TOTAL	13,763,260	78.02
CAMARINES NORTE		
White Lauan	4,391,820	25.28
Red Lauan	3,617,350	20.78
Apitong	2,721,260	15.63
Tangile or Tiaong	1,934,580	11.11
Mayapis	1,351,080	7.76
Guijo	691,170	3.98
Palosapis	408,100	2.34
TOTAL	15,115,360	86.83
ZAMBALES		
Palosapis	1,941,830	16.09
Apitong	1,858,550	15.40
Yakal	1,046,340	8.66
Almaciga	919,620	7.62
White Lauan	844,730	7.00
Tangile	785,660	6.51
Guijo	607,050	5.03
TOTAL	8,003,830	66.31
NUEVA ECIJA		
Apitong	2,361,780	22.26
Red Lauan	1,494,957	14.09
White Lauan	1,365,520	12.87
Tangile	875,320	8.25
Guijo	866,840	8.17
Bagtikan	655,700	6.18
Mayapis	651,450	6.14
TOTAL	8,271,560	77.96
MISAMIS OCCIDENTAL		
White Lauan	2,107,150	24.08
Apitong	1,743,960	19.93
Tangile	1,565,010	17.88
Mayapis	953,570	10.90
Red Lauan	267,560	3.06
Guijo	262,300	2.98
TOTAL	6,899,550	78.83

TABLE IV — Showing the total volume in cubic meters of the principal species (40 cm. and above in diam.) in the 24 provinces.

(1), (2), (3), (4) — First, second, third, fourth groups— (Classification of Philippine Woods for purposes of collection of stampage or Forest Charges.)

Species		
1. White Lauan (3)	226,119,380	Cu. M.
2. Apitong (2)	144,287,650	”
3. Mayapis (2)	111,785,800	”
4. Tangile (2)	111,663,820	”
5. Red Lauan (2)	106,517,370	”
6. Guijo (1)	59,365,720	”
7. Yakal (1)	41,275,100	”
8. Benguet pine (2)	28,358,790	”
9. Manggachapui (1)	24,784,680	”
10. Bagtikan (3)	15,636,810	”
11. Narra (1)	13,471,290	”
12. Almon (3)	13,180,350	”
13. Palosapis (2)	12,703,460	”
14. Malugai (2)	9,264,660	”
15. Nato (2)	8,020,910	”
16. Makaasim (2)	6,541,880	”
17. Manggasinoro (4)	6,145,280	”
18. Dao (1)	6,010,520	”
19. Ipil (1)	5,900,280	”
20. Amugis (2)	5,539,620	”
21. Batete (3)	4,960,540	”
22. Molave (1)	4,833,910	”
23. Oaks (3)	4,405,300	”
24. Lumbayao (2)	4,044,280	”
25. Almaciga (1)	3,858,440	”
26. Narig (1)	3,633,370	”
27. Toog (3)	3,587,500	”
28. Eugenia Spp. (2)	3,377,680	”
29. Kalunti (3)	3,114,830	”
30. Dungon (1)	2,252,030	”
31. Lanipau (3)	2,249,910	”
32. Kalantas (1)	1,872,130	”
33. Maranggo (1)	1,798,880	”
34. Dagang (2)	1,795,570	”
35. Bogo (3)	1,309,860	”
36. Yellow Lanutan (4)	1,199,950	”
37. Bangkal (4)	1,079,580	”
38. Akle (1)	1,110,810	”
TOTAL	1,007,057,890	Cu. M.

TABLE V — Classification of Woods According to Characteristics and Uses.

(A, High in the particular respect listed, coarse-textured; B, moderate in the particular respect listed, moderately fine textured; C, low in the particular respect listed, fine-textured; BA, midway between moderate and high in the particular respect listed, moderately coarse to coarse-textured; CB, midway between low and moderate in the particular respect listed, fine to moderately coarse-textured.)

Species	*Hardness*	*Strength (bending)*	*Toughness*	*Figure*	*Texture*	*Freedom from Odor and Taste*	*Decay Resistance*	*Dry-wood Termite Resistance*	*Distinctive Uses*
Akle	A	B	C	A	CB	C	A	A	Fine furniture, cabinet making, interior finish
Almaciga	B	B	CB	A	C	A	C	C	Household implements, ship decking
Almon	B	B	B	B	B	B	C	B	Cabinet making, construction, boat building
Amugis	A	BA	C	C	C	B	C	B	Construction, floorings, furniture
Apitong	A	B	CB	CB	A	C	C	B	Construction, vehicle works, foundation piles
Bagtikan	B	B	B	B	BA	B	C	B	Furniture, boat planking, constructiou.
Bangkal	B	B	CB	C	C	C	B	B	Construction, carvings, sculpture.
Batote	B	B	CB	B	CB	C	C	CB	Construction, cabinet making
Bogo	A	B	CB	B	CB	B	C	B	Furniture, construction, sculpture, carvings
Dagang									Construction, interior finish
Dao	B	B	A	A	CB	A	C	B	Cabinet timbers, counters, panels, furniture
Dungon	A	B	A	CB	C	C	A	A	Keel & framing of ships, salt-water piling
Eugenia Sp.									House construction and cabinet making
Guijo	A	A	BA	B	CB	BA	C	A	Construction, vehicle works
Ipil	A	A	B	A	CB	C	A	A	Heavy construction, house posts, furniture, interior finish
Kalantas	C	C	C	A	B	C	C	CB	Cigar boxes, ship planking, interior finish
Lanupau									Gen. Construction, often substituted for Lumbayan and tangile
Kalunti	B	B	B	B	CB	A	C	B	Gen. light construction, interior finish
Lauan, yellow	B	B	CB	B	A	B	C	B	Construction, furniture, cabinet making, ship planking

TABLE V — (Continued)

Species	*Hardness*	*Strength (bending)*	*Toughness*	*Figure*	*Texture*	*Freedom from Odor and Taste*	*Decay Resistance*	*Dry-wood Termite Resistance*	*Distinctive Uses*
Lanutan, yellow	BA	B	BA	CB	C	B	C	B	Gen. construction, agricultural implements, sporting goods
Lauan, yellow ...	B	B	CB	B	B	A	C	B	Furniture, construction, boat building
Lumbayan	B	B	CB	B	B	A	C	B	Construction, interior finish, ship planking
Makaasim	A	A	B	BA	C	B	B	A	Ship building, construction
Malugai	B	B	BA	B	CB	A	C	A	General framing works
Manggachapui ..	B	A	BA	CB	C	BA	B	A	General framing works
Manggasinoro ...	C	C	B	B	CB	B	C	CB	Construction, interior finish
Maranggo	B	B	CB	BA	CB	B	C	C	Furniture, interior finish, cigar boxes
Mayapis	C	C	C	B	B	C	C	B	Interior finish, furniture, cigar boxes
Molave	A	A	C	B	C	A	A	A	High-grade constructiion, furniture, interior finish
Narig	A	A	CB	C	C	A	A	A	Novelties, general heavy construction
Narra	B	B	CB	A	CB	C	A	A	High-grade furniture, interior finish veneer
Nato	C	C	C	B	CB	B	C	B	Construction
Oaks	A	A	B	BA	CB	A	C	A	Gen. framings, furniture, interior finish
Palosapis	B	B	B	CB	B	B	C	B	Construction, interior finish
Pine, Benguet ...	B	B	CB	CB	CB	C	C	C	Construction, mine timber
Tangile	B	B	B	B	CB	B	C	B	Cabinet making, interior finish, boat building
Toog	B	B	B	CB	CB	B	C	B	Construction, pilings
Yakal	A	A	BA	B	CB	A	A	A	Heavy construction, boat building

TABLE VI — Quarterly requirements of P. I. for various building products under rehabilitation program, based on a two year program.

Lumber		
Concrete form work	16,000	M. Bd. ft.
Structure timbers	17,000	M. Bd. ft.
Flooring, Millwork & Trim	7,000	M. Bd. ft.
Brick	100,000	M.
Cement	450,000	Bbls.
Gravel	225,000	Tons
Plastering Material	75,000	Bbls.
Sand	250,000	Tons
Lathing	1,250,000	Sq. Yds.
Lime	10,000	Tons
Glass	375,000	Sq. Ft.
Steel Sash	11,000	Sets
Roofing Material	20,000	Squares
Paint—*outside*	100,000	Gals.
Paint—*Inside*	75,000	Gals.
Electric Fixtures	30,000	Units
Plumbing Fixtures		
Water closets	3,000	Units
Lavatories	2,500	"
Urinals	1,500	"
Showers	1,200	"
Drinking fountains	600	"
Service sinks	350	"

TABLE VII — Quarterly requirements of P. I. for various building products for industrial buildings listed for overall proposed industrial program.

Lumber		
Shiplap	2,100	M. bd. ft.
Timbers	2,750	M. bd. ft.
Flooring	350	M. bd. ft.
Brick	26,800	M.
Tile For Partitions	1,250	M.
Sand and Gravel	41,000	Tons
Cement	48,000	Bbls.
Plaster	1,500	Tons
Mill Work		
Sash	37,000	Units
Doors	12,000	"
Trim	1,400	"
Sheet Glass	1,000,000	Sq. Ft.
Roofing Material	15,000	Squares
Paint—*Outside*	44,000	Gals.
Paint—*Inside*	38,000	"

TABLE VIII — Ten year requirements of P. I. for housing program — 240,000 houses.

Cement	1,000,000 Bags
Lime	100,000 Bags
Reenforcing steel	100,000 Bags
Road mesh with 6 x 6, 8 x 8 Gauge to match	100,000 Feet
Nails	30,000 Tons
Bolts	5,000 Tons
Wood screws	1,000 Kegs
Corrugated Metal for walls	75,000 Tons
Toilets with Fittings and roofs	200,000 Units
Bath tubs	200,000 Units
Wash basins	200,000 Units
Laundry tubs	100,000 Units
Kitchen sinks	200,000 Units
Galvanized water pipe crates	15,000 Tons
Electric conduit	10,000 Tons
2 & 3 strand electric light wire	100,000,000 Feet
Switch and fuse boxes	150,000 Units
15—25 amperes fuses	1,000,000 Units
50—60 watts lamps	2,000,000 Units
Soil pipes with fitting & clear cuts 4" & 6"	5,000 Tons
Lead for Caukling traps, Y's	1,000,000 Lbs.
Oakum	1,000,000 Lbs.
Floor drain	200,000 Units
Lighting fixtures	800,000 Units
Switches	400,000 Units
Hardware, sets, hinges, locks, catches for window lifts, catches for window cabinets	1,200,000 Units
Steel sash	800,000 Units
Ridge rolls galvanied iron	2,000,000 Feet
Gutters	4,000,000 Feet
Downspouts	4,000,000 Feet
Vitreous tile	2,500,000 Feet
Septic tanks (steel)	25,000 Units
500—Gallon house pumps for group water supply	10,000 Units
Glass for windows	20,000,000 Sq. Ft.
Water hose with connections	50,000 Feet
Nozzles, Brass	1,000 Units

TABLE IX — Quarter requirements of P. I. for steel products based on two year period except where noted.

Structural Section	7,718 Tons
Bar Sections	4 "
Bars	95 "
Rounds	5 "

Plates	896 Tons
Checker Pls	117 "
Steel Sheet Piling	1,377 "
Pig Iron	610 "
Tin Plate	3,400 "
Sheet Metal Black	2,000 "
Reenforcing bar (5 year period)	41,688 "
Rivets (structural & boiler)	15 "
G. I. Wire	2,100 "
G. I. Rivets) Roofing	750 Kegs
G. I. Washers)	1,500 "
G. I. Corr. Roofing (5 yr. period)	222,126 Sheets
G. I. Flashing (5 year period)	166,000 "
Nails C. W.	64,440 Kegs
Nails Finishing	1,100 "
Black Pipe 1/2 to 6"	418 Tons
G. I. Pipe 1/2 to 6"	3,600 "
Drive Pipe 4-1/2" to 10" W. I. w/Cplgs.	25,000 Lin. Ft.
Drive Shoes 4-1/2" to 10 W.I.	3,500 pieces
Sucker Rod	400 feet
Conduit 1/2 to 2-1/2"	80,174 Lengths
Wire Rope 1/4 ø to 7/8 ø	462,500 Feet
G.I. Rings	500 Pieces
G.I. Thimbles	1,000 "
G.I. Crosby Clips	2,500 "

Railway Material

Rails No. 70 lb.		26,600 Tons
Splice Bars 70 lb. rails		1,295 "
Track Belts 3/4 x 4		123 "
Track Spikes 5/8 x 5-1/2		7,230 "
Nut Locks		12 "
Frogs No. 10		106 "
Switch Parts 15'		104 "
Guard Rails		104 "
Switch Stands No. 17		63 "
Freight Car Wheels & Axles	(Total)	250 Pairs
Passenger Car Wheels & Axles	"	100 "
Tires Freight Cars	"	200 "
Tires Passenger Cars	"	500 "
Car roofing sheets		5,000 Sheets
Material for Water & Oil Tank (116 Reg'd)	(Total)	1,491 Tons
Material for Turntables (58 Reg'd.)	(Total)	1,695 "

Tons of 2,000 Lbs.

TABLE X — Estimated area planted and production of corn in the Philippines by provinces for the crop year ending June 30, 1947.

PROVINCES	AREA PLANTED (Hectares)	PRODUCTION (Cavanes of 57 Kilos)
Abra	4,000	48,000
Agusan	10,000	160,000
Albay	1,450	10,350
Antique	7,000	56,000
Bataan	280	4,200
Batanes	130	1,040
Batangas	23,990	263,890
Bohol	27,850	222,800
Bukidnon	8,680	130,200
Bulacan	3,840	35,330
Cagayan	14,700	235,200
Camarines Norte	1,500	9,000
Camarines Sur	5,500	52,250
Capiz	8,740	75,160
Catanduanes	1,680	20,160
Cavite	3,330	24,980
Cebu	173,000	1,384,000
Cotabato	24,460	513,660
Davao	5,520	110,400
Ilocos Norte	2,240	12,320
Ilocos Sur	1,980	19,800
Iloilo	29,530	295,300
Isabela	21,180	338,880
La Union	1,590	19,080
Laguna	1,160	9,280
Lanao	20,000	260,000
Leyte	69,190	830,280
Marinduque	380	4,940
Masbate	14,970	209,580
Mindoro	1,610	9,660
Misamis Occidental	37,570	488,410
Misamis Oriental	19,000	207,100
Mountain Province	2,210	22,100
Negros Occidental	71,070	746,240
Negros Oriental	68,960	551,620
Nueva Ecija	8,950	63,340
Nueva Vizcaya	1,000	12,000
Palawan	2,570	12,850
Pampanga	4,160	37,440
Pangasinan	19,540	234,480
Quezon (Tayabas)	1,850	18,500
Rizal	1,410	15,510

TABLE X — (Continued)

Romblon	1,060	8,480
Samar	4,510	54,120
Sorsogon	1,620	16,200
Sulu	5,100	48,350
Surigao	5,300	55,650
Tarlac	1,450	12,000
Zambales	110	770
Zamboanga	30,020	360,240
Total	776,940	8,328,140

TABLE XI — Quantity and value of Philippine imports 1940.

NAME OF PRINCIPAL PRODUCTS	QUANTITY	VALUE (PESOS)
Meat Products		
Poultry & game fresh		37,392
Canned		1,383,766
Dried, Smoked, Cured, Pickled, Salted, or Preserved		786,373
Animal Oils & Fats, Edible		
Lard	64,973 K	14,737
Lard compounds & Lard substitute	47,358 "	27,892
Oleomargarine	10,780 "	6,772
All others	12,319 "	15,373
Dairy Products		
Butter		636,260
Cheese	372,981 K	264,536
Milk		8,384,715
Fish & Fish Products		
Fresh		40,131
Canned		2,548,010
Dried, Smoked, Salted or Cured		457,672
Other Edible Animal Products		
Eggs, Fresh		490,082
Eggs, Preserved Dried		20,709
Gelatin, Edible	31,025 K	26,344
Birds' Nests	2,159 "	6,442
Animal Products Inedible		
Hides & Skins		4,406
Leather, Unmanufactured		1,743,669
Manufactures of Leather		1,477,728
Boots, Shoes, Sandals & Slippers (leather taps)		755,710
Other Inedible Animal Products		
Feathers & downs............		1,420
Animal & Fish Oils		89,359
Bone Char	84,592 K	45,628
Horns, Ivory Bone		9,276
Glue	132,045 K	78,076
Isinglass	8,344 "	31,664
Shell & Manufactures of.......		14,584
Animal Wax	784,248 "	224,323
Grains & Preparations		
Barley, Grain	1,312 K	314
Corn	10,705 "	2,512
Oats	491,659 "	43,249
Rice, Glutinous	7,882,715 "	664,269

TABLE XI (Continued) 1940

NAME OF PRINCIPAL PRODUCTS	QUANTITY	VALUE (PESOS)
Rice, Non-glutinous	30,378,550 K	1,787,272
Wheat	11,498 "	1,178
Barley (Pearl)	5,592 "	1,780
Barley (Malt)	1,513,464 "	263,918
Bread	256,206 "	124,001
Biscuits	264,308 "	147,432
Cakes & Puddings	51,777 "	17,637
Flour (Wheat)	102,085,055 "	9,642,054
Flour other than Wheat	84,291 "	12,361
Macaroni, vermicelli, etc.	1,920,175 "	481,869
Oatmeal & rolled oats, oat grits	499,243 '	132,852
Cereal breakfast food and preparations	169,660 "	86,313
Bran	637,465 "	25,016
Poultry feeds	26,438 "	2,738
All others		19,908
Starches		747,435
All others	20,866 "	5,357
Oil cake & oil cake meal		42,956
Fodder	517,027 "	23,460
Hay	257,163 "	17,218
Vegetables & Preparations		
Fresh		1,927,796
Canned		718,597
Dried & otherwise preserved		553,539
Miscellaneous vegetable preparations		979,061
Pickled		286,752
Sauces		451,578
Other vegetable preparations made of		118,192
Fruits & Preparations		
Fresh		2,347,287
Canned		404,625
Dried & otherwise preserved		248,756
Miscellaneous fruit preparations		308,148
Juices		161,852
Pickled		81,196
Chestnuts	23,310 K	16,925
Almonds	577,412 "	56,361

TABLE XI (Continued)

1 9 4 0

NAME OF PRINCIPAL PRODUCTS	QUANTITY	VALUE (PESOS)
Peanuts, shelled, roasted etc. & peanut butter	467,097 "	56,755
Walnuts	126,666 "	22,758
Copra	181,541 K	7,220
Others	39,612 "	24,808
Vegetable Oils & Fats Edible		
Cottonseed oil	1,087,679 K	383,010
Corn oil	1,607 "	1,058
Bean oil	Included in other edible oils	
Olive oil	181,762 K	60,775
Peanut oil	418,232 "	89,246
Sesame oil	34,087 "	8,808
Salad dressing, mayonnaise other edible oils	14,958 "	8,018
Cocoa, Coffee, Tea		
Cocoa		888,899
Coffee		1,678,367
Tea	348,100 K	193,831
Spices		
Cinnamon, cloves, all spice & mace	31,246 K	17,838
Mustard	10,767 "	8,648
Nutmeg	224 "	270
Pepper	113,151 "	36,566
Pimientos (pod-pepper)	12,020 "	7,292
Saffron	1	64
All other spices	3,388 K	2,596
Sugar, Molasses & Syrups		
Gencose	1,879,213 K	278,390
Molasses & syrups	134,025 "	36,260
Sugar		30,260
Chocolate candy	147,357 "	101,660
Other candy	918,796 "	529,453
Confectionary	411,421 "	229,862
Honey	15,059 "	8,459
Chewing Gum		267,642
Beverages, Wines, Liquors		
Fermented liquors		294,528
Distilled spirits		791,761
Whiskey		504,944
Wines		109,143
Other wines		97,696

TABLE XI (Continued)

1940

NAME OF PRINCIPAL PRODUCTS	QUANTITY	VALUE (PESOS)
Rubber & Manufactures		
Bands		16,406
Belts & belting	121,162 K	200,598
Boots & shoes (Pairs)	81,400 "	116,209
Caps	4,538 K	1,708
Cement (Rubber)		50,143
Combs		20,650
Druggist's rubber sundries syringes, etc.		95,288
Garments		32,641
Heels (No.)	2,792,385 "	103,457
Hose	174,100 "	207,609
Packing & gaskets	62,884 "	67,184
Sheets	168,505 "	137,098
Soles, inner	264,480 "	1,940
Soles, Outer (No.)	665,161 "	31,498
Shoes, rubber with canvas tops (Pairs)	72,472 "	123,974
Rubber & friction tapes		510
Tires		3,849,667
Automobile		3,756,717
Bicycle		80,686
Motorcycle		738
Other tires	11,701 "	11,531
Other manufactures of rubber (erasers, stamps gloves, etc.)		234,940
Gums, Resins, Oils		
Gums		55,008
Resins		151,641
Oils, essential		111,854
Oils, fixed		490,514
Boots, Herbs, Banks		
Ginseng	399 "	12,423
Other (roots, herbs banks)		42,987
Vegetable wax	1,033,191 "	265,485
Tobacco & Manufactures		
Unmanufactured		1,058,707
Manufacture of		13,695,891
Seed, (Except oil seeds, & Nursery Stock)		
Seedlings, bulbs, plants	26,288 "	9,183
Melon seed	45,887 "	7,530
All other vegetable seeds	99,928 "	34,022
All other seeds	395,155 "	54,847

TABLE XI (Continued)

1940

NAME OF PRINCIPAL PRODUCTS	QUANTITY	VALUE (PESOS)
Miscellaneous Vegetable Products		
Artificial eyes, teeth, limbs ...		19,160
Agar-agar		650
Artificial flowers & fruits	155 K	11,229
Bakelite, galalith and cassein compounds	39,604 "	31,368
Blacking & leather dressings (shoe cleaners)		142,763
Hops	7,756 "	81,191
Moss & seaweeds, Canned	4,342 "	1,094
Moss & seaweeds, dried	15,433 "	5,558
Straw, Rushes, & Palm Leaf		
Mats & matting		16,581
Sandals & slippers (Pairs) ...	641 "	341
Straw braid		489
Bags & baskets		3,167
All others		26,812
Textile Fibers & Manufactures		
Cotton		34,139,352
Semi-manufactures		1,522,578
Manufactures of		32,037,690
Cloth		23,261,646
Fabrics		206,097
Household articles		515,898
Wearing apparel-knit goods ...		2,631,075
Wearing apparel-not knit		721,135
Other wearing apparel		263,369
Miscellaneous cotton manufacture		14,308
Flax & Linen		767,513
Jute, and other fibers		5,292,364
Coconut products		4,148
Wool & wool manufactures ...		1,428,058
Semi-manufactures of		44,602
Hair & manufactures		56,778
Silk manufactures		1,031,366
Woven fabrics		86,973
Wearing apparel		681,794
Other manufactures		166,153
Rayon or other synthetic textiles & manufactures		8,619,704
Miscellaneous textiles products.		344,285
Miscellaneous textile Products,		

TABLE XI (Continued)

1 9 4 0

NAME OF PRINCIPAL PRODUCTS	QUANTITY	VALUE (PESOS)
oilcloth		237,813
Woods and Wood Manufactures		
Logs		54,954
Timber		33,151
Other unmanufactures		64,640
Lumber (sawed boards)		180,303
Furniture & parts of		44,990
Bags & baskets		34,856
Cork & Manufactures		
Stoppers	49,796 K	42,036
Boards or in sheets	89,390 "	33,086
Life preservers	2,274 "	2,384
Paper & Manufactures		
Unprinted		1,800,394
Printing paper		3,455,134
Wrapping paper		1,459,845
Paste board & cardboard		1,356,432
Albums		11,528
Non-Metallic Minerals		
Coal & related fuels		3,069,098
Petroleum & products		24,922,597
Petroleum asphalt		574,234
Stone, lime, cement & gypsum products		331,058
Glass & glass products		2,036,008
Bottles, vials, jars, etc.		748,043
Glassware		879,043
Clay, clay products and other non-metallic minerals		1,839,325
Asbestos		119,880
Precious stones & imitations		71,758
Metals & Manufactures		
Iron and steel semi-manufactures		12,822,173
Sheets & plates		8,259,136
Steel mill products		6,359,298
Structural iron & steel		1,894,435
Wires & manufactures		1,663,748
Nails		1,523,660
Iron & steel advanced		8,078,153
Cutlery		360,484
Tools		1,229,672
Pipes & pipe fittings		4,269,075

TABLE XI (Continued)

1940

NAME OF PRINCIPAL PRODUCTS	QUANTITY	VALUE (PESOS)
Machinery, except agricultural and electrical		15,047,274
Mining machinery		3,925,176
Printing & bookbinding machinery		429,077
Power Generating Machinery		2,210,833
Construction & conveying machinery		422,911
All other machinery		7,108,818
Agricultural machinery & implements		442,342
Electrical machinery & apparatus		7,591,327
Vehicles		12,300,960
Non-ferrous metals, except precious		4,246,206
Aluminum & manufactures		323,578
Brass & manufactures		1,300,361
Copper & manufactures		1,577,910
Bars, ingots, slabs or pigs	186,372 K	103,668
Lead & manufactures		409,078
Tin & manufactures		
Zinc & manufactures		340,270
Precious metals, jewelry & plated ware		685,466
Gold, platinum, and silver manf. not plated		300,358
Plated ware, gold and silver		376,982
Miscellaneous metal manufactures		4,106,856
Meters		184,850
Chemicals, Drugs, Dyes and Medicines		
Acids		269,170
Other chemicals		3,673,463
Drugs		116,864
Medicinal & pharmaceutical preparations		3,648,367
Dyes		405,479
Dyeing & Training materials		24,558
Fertilizers and Fertilizer Materials		
Mixed fertilizers	1,221,209 K	6,966,119

TABLE XI (Continued)

1940

NAME OF PRINCIPAL PRODUCTS	QUANTITY	VALUE (PESOS)
Nitrate of potash	55,834 "	7,531
Nitrate of soda	7,370,060 "	322,721
Phosphate of ammonia	21,442,468 "	2,141,852
Sulphate of ammonia	51,549,335 "	4,098,859
Sulphate of potash	233,744 "	19,650
Superphosphate	509,262 "	34,795
Other chemical fertilizers	1,820,002 "	138,650
Animal fertilizers	125,869 "	11,011
Explosives, Fireworks and Ammunitions		
Blasting caps	43,346 K	312,964
Cartridges		238,294
Dynamite	4,249,612 "	2,289,171
Fuses	378,402 "	464,882
Fireworks & firecrackers		22,895
Pigments, Paints, & Varnishes		
Lead, white	206,443 "	86,962
Lead, red	124,273 "	49,460
Litharge	179,858 "	60,565
Lithopone	21,468 "	4,486
Other iron oxide and other mineral earth pigments	389,179 "	31,439
Paints		1,708,962
Soap and Toilet Preparations		
Soap		796,649
Toilet preparations		1,791,400
Miscellaneous		
Photographic goods, scientific & professional instruments		1,823,003
Cameras		85,913
Film		813,044
Musical instruments		654,082
Toys games & sporting goods		942,501
Clocks, watches and parts		658,806
Clocks		159,005
Brooms and brushes		305,117
Brushes		6,176
Buttons		401,913
Celluloid manufactures		163,551
Combs, except metal & rubber		214,835
Ink and ink powders		287,137
Pencils and pens		649,430

TABLE XII — Appropriate areas (in hectares) of accessible pasture lands in the Philippines.

PROVINCES	Accessible	Under permits as of 1940	Under Application (2)	
			Approved	Pending
1. Abra	(4) 36,830	1,135	195.90	56.00
2. Albay	15,122	18	—	—
3. Agusan	—	—	—	200.00
4. Antique	16,762	326	—	15.00
5. Bataan	(3) —	69	—	—
6. Batangas	5,958	—	—	50.00
7. Batanes	3,472	—	—	—
8. Bohol	12,736	530	150.00	400.00
9. Bukidnon	67,597	30,381	2,512.00	7,844.00
10. Bulacan	(3) —	15	—	—
11. Cagayan	2,283	2,955	242.00	537.00
12. Camarines Norte	1,348	40	—	1,029.00
13. Camarines Sur	6,646	202	19.00	1,200.00
14. Capiz	78,101	293	252.60	339.00
15. Catanduanes	—	—	—	—
16. Cavite	5,114	—	—	—
17. Cebu	3,241	15	—	—
18. Cotabato	34,279	13,822	—	8,800.00
19. Davao	27,446	4,324	1,000.00	4,500.00
20. Ilocos Norte	11,504	1,946	1,257.37	576.30
21. Ilocos Sur	31,615	718	—	48.00
22. Iloilo	52,288	5,789	887.86	2,048.28
23. Isabela	51,300	4,067	1,801.00	5,437.00
24. Laguna	—	—	—	—
25. Lanao	—	—	—	—
26. La Union	11,562	237	—	—
27. Leyte	1,010	8	—	—
28. Marinduque	4,633	—	—	—
29. Masbate	44,162	10,930	2,388.74	8,794.26
30. Mindoro	102,197	2,486	1,712.00	9,417.38
31. Misamis Occidental	—	87	—	—
32. Misamis Oriental	29,836	8,399	2,539.00	625.00
33. Mountain Province	—	4,271	72.13	277.00
Apayao	17,585	—	—	—
Benguet & Baguio.	31,217	—	—	—
Bontoc	40,536	—	—	—
Ifugao	58,757	—	—	—
Kalinga	36,116	—	—	—
34. Nueva Ecija	10,992	5,910	634.00	661.38
35. Nueva Vizcaya	84,835	14,741	1,464.80	4,791.00
36. Negros Occidental	12,267	1,176	—	—
37. Negros Oriental	7,600	2,886	—	—
38. Palawan	19,445	651	—	200.00
39. Pampanga	12,070	957	—	—
40. Pangasinan	23,299	2,812	833.24	1,085.15
41. Quezon	2,534	487	316.60	2,542.00
42. Rizal & Manila	4,144	113	60.75	—
43. Romblon	2,227	—	—	—
44. Samar	—	—	—	—
45. Siquijor	486	—	—	—
46. Sorsogon	4,084	—	—	—
47. Sulu	4,366	200	—	
48. Surigao	908	—	—	

TABLE XII (Continued)

PROVINCES	Accessible	Under permits as of 1940	Under Application (2)	
			Approved	Pending
49. Tarlac	6,237	973	70.70	240.00
50. Zambales	24,942	1,266	—	2,250.00
51. Zamboanga	33,197	1,532	—	—
TOTAL........	1,094,886 (1)	126,717 (1)	18,409.69	63,973.15

(1)—These figures do not include the areas suitable and used for pasture but outside of timber land and unclassified public forest and leased from the Bureau of Lands prior to June 8, 1939, when the Pasture Land Act went into effect. In the province of Bukidnon and Cotabato, specially, there are thousands of hectares so used.

(2)—As of June 30, 1946.

(3)—Pursuant to the Provisions of Commonwealth Act No. 452 of 1939, some areas have been re classified and reverted to the category of forest pasture land, and vice versa.

(4)—Correct as of June 30, 1946.

TABLE — XIII Trend of real wages of laborers in industrial and commercial establishments in Manila, by occupations: 1941-1945-1946.

OCCUPATION	AVERAGE DAILY WAGES (Pesos)			Index (1941-100)		Daily Real Wages 2 (Pesos)	
	1941	1945	1946	1945	1946	1945	1946
Blacksmiths	2.55	4.25	5.57	166.6	218.4	0.62	1.07
Boilermen	2.82	6.40	5.20	226.9	184.3	0.94	1.00
Carpenters	2.75	6.02	6.66	218.9	242.1	0.97	1.28
Chauffeurs	1.64	4.05	5.78	264.9	352.4	0.59	1.11
Cigar-makers	0.96	2.83	4.87	294.7	507.2	0.41	0.93
Compositors	1.84	6.14	7.29	333.6	396.1	0.90	1.40
Draftsmen	3.28	7.54	7.48	232.9	228.0	1.10	1.40
Electricians	2.67	5.20	7.82	194.7	292.8	0.76	1.50
Foremen	3.35	7.38	7.96	220.2	237.6	1.08	1.53
Lathemen	2.60	4.88	7.31	187.7	281.1	0.71	1.40
Linotypists	2.64	10.22	10.17	387.1	385.2	1.50	1.95
Machinists	2.23	5.75	6.48	257.8	290.5	0.84	1.24
Masons	1.94	5.90	6.58	304.1	339.1	0.85	1.26
Mechanics (auto)	3.00	7.46	6.90	248.6	230.0	1.08	1.32
Painters	1.83	7.77	6.28	424.5	343.1	1.14	1.21
Plumbers	2.00	4.80	7.67	240.0	383.5	0.70	1.47
Tinsmiths	1.72	4.23	5.04	245.9	298.0	0.62	0.97
AVERAGE—							
Skilled laborers	2.34	5.93	7.76	261.7	306.1	0.87	1.30
Common Laborers	1.24	3.27	4.53	263.7	365.3	0.66	0.87

1 Preliminary, subject to change as more data become available.

2 Wage in terms of goods and services it can buy. This is obtained by dividing the 1945 and 1946 wages by the cost of living index for the year 1945 (683.3) and 1946 (520.9). Commonwealth Act No. 444 limits regular working hours to eight a day.

TABLE XIV. Proposed Hydro-Electric Plants

NAME & LOCATION	Capacity KW	Annual Generation KWH	No. of Units	Rated Capacity Turbine HP	Effective Head Meters	Maximum Q of Turbine M3/sec.	Type and Setting of Turbines	Rated Capacity of generator KVA at 80% L. F.	Estimated Cost at Pre-war Values
Lumot River, Laguna	8,000	50,000,000	1	12,500	271.50	3.6	Vertical Francis	10,000	2,700,000.00
Botocan River, Laguna	16,000		2	10,500	200.00	4.5	" "	10,000	
Penaranda Chute, Nueva Ecija	600	4,000,000	1	840	7.00	11.0	Vertical Kaplan	750	240,000.00
Talavera Chute, Nueva Ecija	600	3,600,000	2	420	15.10	2.40	" "	750	180,000.00
Agno River No. 1, Itogon, Benguet	18,000	72,000,000	3	8,000	60.60	12.0	Vertical Francis	22,500	5,000,000.00
Agno River No. 2 Ambuklao	32,000	140,000,000	4	12,500	82.00	13.0	" "	40,000	6,500,000.00
Agus River No. 6, Maria Cristina Falls, Lanao	200,000	1,500,000,000	6	46,000	151.10	26.6	" "	42,000	16,000,000.00
Angat River Bulacan	16,000	110,000,000	2	12,500	54.30	20.0	" "	10,000	7,200,000.00
Camiling River, Tarlac	2,400	17,000,000	2	1,800	42.00	3.7	" "	1,500	1,700,000.00
Amburayan Chute, La Union	330	2,750,000	1	500	7.00	6.0	Vertical Kaplan	420	150,000.00
Gasgas River, Solsona, Ilocos Norte	1,500	9,800,000	2	1,000	49.00	2.0	Vertical Francis	900	550,000.00
Bosigon River, Camarines Norte	1,100	9,860,000	2	1,250	27.00	4.0	" "	1,000	1,300,000.00
Barit River, Iriga, Camarines Sur	1,100	8,200,000	1	1,500	19.00	10.0	" "	1,375	460,000.00
Cawayan River, Sorsogon	130	2,650,000	1	650	40.00	1.5	" "	600	180,000.00
Mantayupan River, Cebu	403	3,000,000	2	320	112.00	0.25	" "	250	300,000.00
Loboc River, Bohol	2,000	14,000,000	2	1,500	21.50	6.00		1,250	380,000.00
Sibulan Falls, Davao	4,300	24,500,000	1	6,400	275.00	2.00	Impulse. Horizontal	5,000	1,330,000.00
TOTAL	298,010	1,981,300,000							

TABLE XV. Pre-war Power Capacity and Population Served
NOVEMBER, 1946

PROVINCES OR CITIES	TOTAL CAPACITY BEFORE WAR		CAPACITY SUPPOSED TO BE AT PRESENT USED				CAPACITY BEFORE WAR OPERATED BY HYDRO POWER		Population served before war
			OIL FUEL		WATER				
	KW	KVA	KW	KVA	KW	KVA	KW	KVA	
Abra	25				—	—	—	—	15,287
Agusan	—	88.3			—	—	—	—	38,549
Albay	713	—	575		—	—	—	—	200,616
Antique	—	57	—	—	—	—	—	—	29,140
Bataan	15	375	15	375	—	—	—	—	84,038
Batangas	527.6	1,237.2	91.6	—	—	—	—	—	314,012
Bohol	65	178	—	137.5	—	—	—	—	108,453
Bulacan	—	424.1	—	261.1	—	—	—	—	326,981
Cagayan	307.5	—	—	—	—	—	—	—	64,915
Camarines Norte	—	400	—	400.0	—	—	—	—	56,153
Camarines Sur	382	92.5	—	—	—	—	—	—	116,504
Cavite	—	440	—	—	—	—	—	—	172,962
Capiz	27	579	—	—	—	—	—	—	128,288
Cebu	3294.3	207.5	3172	(gas)	—	—	—	—	557,612
Cotabato	200	—	200	—	—	—	—	—	10,166
Davao	—	776.3	—	737	—	—	—	—	129,349
Ilocos Norte	—	478	—	420	—	—	—	—	102,878
Ilocos Sur	357.5	18.7	287.5	—	—	—	—	—	76,341
Iloilo	115	2,055.6	—	1928	—	—	—	—	449,622
Isabela	69	180	69	180	—	—	—	—	31,726
Laguna	43.4	22,818.5	25	122.5	—	1496	—	22,696	256,348
Lanao	—	200.3	—	68.5	—	—	—	—	89,692
La Union	—	226.6	—	168	—	—	—	—	69,541
Leyte	565	352.9	451	40	—	—	—	—	326,306
Manila	29,500	—	29,500	(coal)	—	—	—	—	623,492
Marinduque	30	—	30	—	—	—	—	—	30,977
Masbate	32	—	32	—	—	—	—	—	23,312
Mindoro	37	119	—	37.5	—	—	—	—	62,521
Misamis Occidental	90	58.5	—	37.5	—	—	—	—	127,217
Misamis Oriental	109.5	357.3	—	31.3	—	—	—	—	108,720
Mountain Province	2681	125	—	—	—	—	81	125	38,401
Negros Occidental	234	1,670	50	708	—	—	—	25	766,751
Negros Oriental	—	489	—	365	—	—	—	—	129,368
Nueva Ecija	314	727.5	—	395	—	—	—	—	307,578
Nueva Vizcaya	—	154	—	—	—	—	—	—	30,016
Pampanga	50	—	—	1299.9	—	32.6	—	82.5	397,612
Palawan	—	25	—		—	—	—	—	10,887
Pangasinan	842	206	—	50	—	—	—	—	434,961
Rizal	—	606.3	—		—	—	—	—	429,871
Romblon	72.5	—	—	—	—	—	—	—	14,309
Samar	—	309.6	—	—	—	—	—	—	117,519
Sorsogon	179	185	—	125	—	—	—	—	127,474
Sulu	—	240	—	240	—	—	—	—	12,571
Surigao	—	37.5	—	—	—	—	—	—	34,289
Tarlac	—	582.8	—	128.8	—	—	—	—	196,070
Quezon (Tayabas)	175	135.5	100	—	30	—	—	—	233,355
Zambales	50	—	—	—	—	—	—	—	18,022
Zamboanga	756	132.5	—	—	—	—	756	—	163,059

WAR DAMAGE CLAIMS

MANILA RAILROAD COMPANY

Filed with the War Damage Commission:		
Road—		
Railroad Tracks	₱1,719,290.00	
Bridges	2,960,200.00	
Communications System	1,148,364.00	
Signals, Interlockers & Cross-Gates	356,521.00	
Shop & Enginehouse Equipment	304,161.22	
Wharves & Docks	65,400.00	
Turntable & Track Scales	34,240.00	
Water & Fuel Stations	99,630.00	
Tools, Engineering	75,775.00	
Buildings	2,032,610.00	₱ 8,796,191.22
Equipment—		
Locomotives	₱5,855,700.00	
Passenger Coaches	3,769,600.00	
Freight Cars	2,972,800.00	
Baggage, Express, Mail & Service Cars	1,357,900.00	
Rail Motor Cars & Trailers	1,366,500.00	
Vessels	503,000.00	15,825,500.00
Miscellaneous Physical Property—		
Arrastre Equipment, Manila Port Terminal	₱ 142,100.00	
Benguet Auto Line	126,440.00	
Luzon Bus Line	56,100.00	
Other Miscellaneous Physical Property	167,200.00	491,840.00
Materials and Supplies		2,625,974.00
Total		₱27,739,505.22

War Damage Claims—(Continued)

Filed with the U. S. Army:		
Miscellaneous Physical Property—		
Benguet Auto Line	₱ 465,000.00	
Luzon Bus Line	525,000.00	
Mindanao Motor Line	369,342.45	1,359,342.45
GRAND TOTAL		₱29,098,847.67

Note:

From the war damage claims of ₱27,739,505.22 with the War Damage Commission, the amount of ₱3,000,000.00 only is expected to be paid; hence, the unpaid portion of the claims has to be charged to Surplus Account in the *pro forma* Balance Sheet of the Company.

PROPOSED ALLOCATION OF THE U.S.—PHILIPPINE WAR DAMAGE OF ₱110,000,000.00 FOR THE REPAIR OF DAMAGED PUBLIC IMPROVEMENTS

EARMARKED

1.	New Capitol	₱40,000,000.00
2.	University of the Philippines	16,000,000.00
3.	Metropolitan Water District	2,000,000.00
4.	Tenement Houses	300,000.00
5.	Equipment and furniture	1,000,000.00
6.	Beds and equipment, PGH	100,000.00
7.	Library and equipment, U. P.	200,000.00
8.	Philippine Normal School, main	250,000.00
9.	” ” Training Dept.	250,000.00
10.	Phil. General Hospital	350,000.00
11.	Mariveles Quarantine	100,000.00
	Total	₱60,550,000.00

PRIORITIES

		EXTENT OF DAMAGE	PER-CENT	ALLOCATION
1.	Hospital, including P.G.H.	₱ 10,879,490	41.36%	₱ 4,500,000
2.	Waterworks and irrigation	18,000,000	27.50%	4,950,000
3.	Schools	148,128,987	20.75%	30,000,000
4.	National Government Buildings	108,253,370	2.77%	3,000,000
5.	Provincial and municipal government buildings	45,984,052	6.54%	3,000,000
6.	Other government Corporations	30,000,000	3.33%	1,000,000
7.	Manila Railroad Company and Manila Hotel	35,000,000	8.57%	3,000,000
	Totals	₱496,245,900		₱49,450,000

Proposed Allocation etc.—*cont'd.*

SUMMARY

Total Allocation	₱110,000,000
Earmarked	60,550,000
Proposed Allocation	₱ 49,450,000

NOTE:

1. Amounts for Items 8, 9, 10, and 11 of earmarked projects, totalling ₱950,000.00, have been released and are to be added to each of the different priorities where they fall in the allocation of ₱49,450,000, as shown above.

2. Additional awards for Items 8, 9, 10, and 11 are to be taken from the final allocation of ₱49,450,000 for each of the priority classifications where they properly fall.

WAR DAMAGE CLAIMS

NATIONAL DEVELOPMENT COMPANY AND SUBSIDIARIES

NDC Proper	₱ 317,710.51	
Sabani Estate	30,380.95	
Malangas Coal Mines	612,609.53	
NDC Pet. Tech. Com.	1,291,435.49	
Copra Central	27,991.22	
Surigao Iron	174,379.96	
Textile Mills	44,275.16	2,498,782.82
National Foods		1,683,035.20
National Footwear		451,754.34
Insular Sugar Refining Corp.		1,871,985.04
Cebu Portland Cement Co.		2,709,052.06
Naric		3,563,661.20
Total		₱12,907,390.28

RECENT EXPORT STATISTICS

FOR

NINE LEADING COMMODITIES

PERIOD JANUARY 1st TO SEPTEMBER 30th 1947

Commodity	*Quantity*		*Value in Pesos*
Copra	726,110	Long tons	266,437,514.48
Surplus Equip.	1,214	Units*	10,240,560.43
Copra meal & cake	17,613	Long tons	2,405,061.91
Cordage	1,954	Long tons	2,161,535.25
Lumber	4,138,214	Bd. ft.	1,213,946.80
Leaf Tobacco	2,610,579	Kilos	1,939,251.51
Soap Emulsion	2,455	Long tons	1,653,650.00
Scrap Metals	7,333	Tons	1,103,142.77
Vegetable Lard	887	Tons	968,601.04
		Total	288,123,264.19

* Principally tractors.

Note: The figures only include export that require licenses for shipment outside the Philippines.

TOTAL MINE GOLD PRODUCTION—1940

(Courtesy, Chamber of Mines of the Philippines)

LODE MINES	Tons Milled	Value	Average value Per Ton
Aldecoa	77	₱ 1,075	₱ 13.96
Antamok Goldfields	193,966	2,630,544	13.56
Antipolo Mining	5,736	108,717	18.95
Baguio Gold	142,545	2,226,682	15.62
Balatoc	738,716	13,417,327	18.16
Batong-Buhay	8,821	220,621	25.01
Benguet Cons.	467,130	10,990,624	23.53
Benguet Expl. (Tawig)	—	4,593	—
Benguet Goldfields	32,210	616,855	19.15
Big Wedge	75,642	2,114,104	27.95
Cal Horr (inc. Ukab)	85,162	1,445,507	16.97
Camp Four	1,372	5,036	3.67
Capsay	43,183	1,069,835	24.77
Crown Mines	7,814	135,910	17.39
Davao Gold	4,334	94,878	21.89
Demonstration	44,360	499,828	11.27
East Mindanao	39,253	764,737	19.48
Gold Creek	9,304	160,523	17.25
Gumaos Goldfields	27	533	19.18
Guy Wiley Group	46	642	13.96
Ipo Gold	71,145	721,159	10.14
Itogon	327,062	5,370,449	16.42
I. X. L.	144,868	3,078,779	21.25
Kilometer 73	10,023	164,176	16.38
Layog	12,668	126,656	10.00
Macawiwili	30,992	357,650	11.54
Mapaso Goldfields	11,940	65,039	5.45
Masbate Cons.	1,078,573	6,372,308	5.91
Masbate Goldfields	15,998	105,428	6.59
Mayon	20,677	457,296	22.12
Mindanao M. Lode	68,487	2,183,328	31.88
Mineral Resources	33,496	415,944	12.42
Nabago Gold	—	4,070	—
North Camarines	63,944	1,510,104	23.62
Northern Mining (Tuba)	23,670	668,530	28.24
Paracale Gold	1,686	28,427	16.86
Paracale-Gumaus	71,922	1,917,695	26.66
Paracale Mining	5,551	38,913	7.01
Paracale National	13,545	340,087	25.11
Pugo	3,015	16,677	5.53
San Mauricio	182,716	5,988,405	32.77
Santa Rosa	51,340	569,644	16.94
Shevlin Gold	322	1,528	4.75
Surigao Cons.	117,012	2,182,172	18.65
Suyoc Cons.	79,152	2,002,082	25.29
Treasure Island	57,843	1,538,089	26.59
Twin Rivers	17,682	21,256	1.20
United Paracale	126,321	3,265,657	25.85
TOTAL	4,541,348	₱76,320,119	₱16.81

Placer Properties	*Cu. Yds. Handled*	*Value*	*Average value cu. yd.*
Coco Grove	3,897,357	₱1,617,459	₱ 0.42
Mindanao Mining	202,832	116,448	0.57
North Mindanao	144,718	98,319	0.68
Santa Cecilia	48,862	35,316	0.72
Tambis Gold	315,335	120,628	0.38
TOTAL	4,609,104	₱1,988,170	₱ 0.43

Based on mine assays.

SUMMARY:

Total, lode mines	₱ 76,320,119
Total, Placer properties	1,988,170
GRAND TOTAL	₱ 78,308,289

BASE METAL PRODUCTION

(Courtesy Chamber of Mines of the Philippines)

Copper Concentrates

Year	Tons	Value
1936 ...	5	₱ 1,704
1937 ...	2,246	577,709
1938 ...	3,889	1,367,099
1939 ...	6,047	2,236,393
1940 ...	7,957	3,338,635

Copper Ore

Year	Tons	Value
1936 ...	———	₱ ———
1937 ...	13,000	287,200
1938 ...	17,733	305,656
1939 ...	25,333	726,091
1940 ...	29,874	954,905

Chrome Ore

Year	Tons	Value
1936 ...	6,645	₱ 249,270
1937 ...	79,490	1,500,578
1938 ...	40,353	803,231
1939 ...	132,177	2,295,167
1940 ...	186,002	2,612,192

Iron Ore

Year	Tons	Value
1936 ...	496,256	₱2,108,841
1937 ...	593,894	2,139,048
1938 ...	912,405	3,655,682
1938 ...	1,166,781	4,914,800
1940 ...	1,236,206	5,564,992

Lead-Zinc

Year	Tons	Value
1936 ...	———	₱ ———
1937 ...	———	48,364
1938 ...	———	139,848
1939 ...	Lead 44	6,781
1940 ...	" 1,041	118,008

Manganese Ore

Year	Tons	Value
1936 ...	2,549	₱ 47,156
1937 ...	25,218	495,551
1938 ...	58,143	1,098,770
1939 ...	29,394	602,623
1940 ...	52,166	1,420,389

Total Base Metal Production

Year	Tons	Value
1934 ...	———	₱ 83,799
1935 ...	———	1,310,867
1936 ...	605,455	2,406,971
1937 ...	713,848	5,048,450
1938 ...	1,032,523	7,370,286
1939 ...	1,359,730	10,781,855
1940 ...	1,513,246	14,009,121

EXCERPTS FROM CONSTITUTION AND EXECUTIVE ORDERS OF PERTINENT IMPORTANCE

CONSTITUTION OF THE PHILIPPINES

ARTICLE XIII

CONSERVATION AND UTILIZATION OF NATURAL RESOURCES

Section 1. All agricultural, timber, and mineral lands of the public domain, water, minerals, coal, petroleum, and other mineral oils, all forces of potential energy, and other natural resources of the Philippines belong to the State, and their disposition, exploitation, development, or utilization shall be limited to citizens of the Philippines, or to corporations or associations at least sixty per centum of the capital of which is owned by such citizens, subject to any existing right, grant, lease, or concession at the time of the inauguration of the Government established under this Constitution. Natural resources, with the exception of public agricultural land, shall not be alienated, and no license, concession, or lease for the exploitation, development, or utilization of any of the natural resources shall be granted for a period exceeding twenty-five years, renewable for another twenty-five years, except as to water rights for irrigation, water supply, fisheries, or industrial uses other than the development of water power, in which cases beneficial use may be the measure and the limit of the grant.

Section 2. No private corporation or association may acquire, lease, or hold public agricultural lands in excess of one thousand and twenty-four hectares, nor may any individual acquire such lands by purchase in excess of one hundred and forty-four hectares, or by lease in excess of one thousand and twenty-four hectares, or by homestead in excess of twenty-four hectares. Lands adapted to grazing, not exceeding two thousand hectares, may be leased to an individual, private corporation or association.

Section 3. The Congress may determine by law the size of private agricultural land which individuals, corporations, or associations may acquire and hold, subject to rights existing prior to the enactment of such law.

Section 4. The Congress may authorize, upon payment of just compensation, the expropriation of lands to be subdivided into small lots and conveyed at cost to individuals.

Section 5. Save in cases of hereditary succession, no private agricultural land shall be transferred or assigned except to individuals, corporations, or associations qualified to acquire or hold lands of the public domain in the Philippines.

Section 6. The State may, in the interest of national welfare and defense, establish and operate industries and means of transportation and communication, and, upon payment of just compensation, transfer to public ownership utilities and other private enterprises to be operated by the Government.

ARTICLE XIV

GENERAL PROVISIONS

Section 4. The State shall promote scientific research and invention. Arts and letters shall be under its patronage. The exclusive right to writings and inventions shall be secured to authors and inventors for a limited period.

Section 7. The Congress shall not, except by general law, provide for the formation, organization, or regulation of private corporations, unless such corporations are owned or controlled by the Government or any subdivision or instrumentality thereof.

Section 8. No franchise, certificate, or any other form of authorization for the operation of a public utility shall be granted except to citizens of the Philippines or to corporations or other entities organized under the laws of the Philippines, sixty per centum of the capital of which is owned by citizens of the Philippines, nor shall such franchise, certificate, or authorization be exclusive in character or for a longer period than fifty years. No franchise or right shall be granted to any individual, firm, or corporation, except under the condition that it shall be subject to amendment, alteration, or repeal by the Congress when the public interest so requires.

REPUBLIC ACT No. 11

SLAUGHTERING OF CATTLE

An Act to Prohibit the Slaughtering of Male and Female Carabaos, Horses, Mares, and Cows.

Be it enacted by the Senate and House of Representatives of the Philippines in Congress assembled:

Section 1. Any provision of existing laws to the contrary notwithstanding, slaughtering of male and female carabaos, horses, mares, and cows is hereby prohibited unless authorized by the Secretary of Agriculture and Commerce.

Section 2. Any person who violates the provisions of the preceding section shall be punished with a fine of not less than two hundred pesos nor more than five hundred pesos or by imprisonment of not less than two months nor more than six months, or both fine and imprisonment at the discretion of the court.

Section 3. The Secretary of Agriculture and Commerce shall promulgate such rules and regulations as will effectively carry out the provisions of this Act. However, when in the opinion of the Secretary of Agriculture and Commerce there exists a sufficient number of work animals for agricultural purposes in the Philippines, the President may declare this Act inoperative.

Section 4. This Act shall take effect upon its approval.

Approved, September 2, 1946.

REPUBLIC ACT No. 16

LOANS FOR REHABILITATION

An Act Authorizing the President of the Philippines to obtain such loans or incur indebtedness with the Government of the United States, its agencies and instrumentalities, as may be necessary to cover budgetary deficits and other expenditures of the Government of the Republic of the Philippines for rehabilitation and other purposes, and appropriating the necessary funds therefor.

Be it enacted by the Senate and the House of Representatives of the Philippines in Congress assembled:

Section 1. The President of the Philippines is hereby authorized to negotiate such loans or to incur such indebtedness with the Government of the United States, its agencies and instrumentalities, as may be necessary to cover budgetary deficits and other expenditures of the Government of the Republic of the Philippines for rehabilitation purposes, including the purchase of necessary equipment or of surplus and other kinds of property from the United States, under such terms and conditions as may be agreed upon.

Section 2. The authority herein granted to the President shall be deemed to include the authority to guarantee loans and credits extended to the corporations owned or controlled by the Government of the Republic of the Philippines.

Section 3. It shall be the duty of the President as soon as a loan is obtained or an indebtedness is incurred, to report to the Congress the amount of loan obtained and to submit a detailed program of expenditures for its approval.

Section 4. The necessary amount is hereby appropriated out of any funds in the National Treasury not otherwise appropriated to pay the principal and interest on such loan or indebtedness as and when they shall become due.

Section 5. This Act shall take effect upon its approval.

Approved, September 18, 1946.

REPUBLIC ACT No. 35

INDUSTRIES EXEMPTED FROM REVENUE TAXES

An Act Authorizing the Exemption of new and necessary industries from the payment of Internal Revenue Taxes.

Be it enacted by the Senate and House of Representatives of the Philippines in Congress assembled:

Section 1. Any person, partnership, company, or corporation who or which shall engage in a new and necessary industry shall, for a period of four years from the date of the organization of such industry, be entitled to exemption from the payment of all internal revenue taxes directly payable by such person, partnership, company or corporation in respect to said industry.

Section 2. The President of the Philippines, shall upon recommendation of the Secretary of Finance, periodically determine the qualifications that the industries should possess to be entitled to the benefits of this Act.

Section 3. This Act shall take effect upon its approval.

Approved, September 30, 1946.

FIRST CONGRESS OF THE REPUBLIC OF THE PHILIPPINES }
Second Session

S. No. 163

[Republic Act No. 121]

An Act to further amend section eighteen hundred and thirty-eight of Act numbered twenty-seven hundrd and eleven, known as the Revised Administrative Code, as amended by Act numbered thirty-eight hundred and twenty and Commonwealth Act numbered one hundred.

Be it enacted by the Senate and House of Representatives of the Philippines in Congress assembled:

Section 1. Section eighteen hundred and thirty-eight of Act Numbered Twenty-seven hundred and eleven, known as the Revised Administrative Code, as amended by Act Numbered Thirty-eight hundred and twenty and Commonwealth Act Numbered One hundred, is hereby further amended to read as follows:

"Sec. 1838. *Leasing of forest land for special purposes.*—The Director of Forestry with the approval of the Secretary of Agriculture and Commerce, may, upon such terms as he may deem reasonable, lease or grant to any Filipino citizen or association of persons duly incorporated and authorized by the Constitution to acquire lands of the public domain, permits for the use of forest lands or vacant public lands not declared agricultural land, for a period not exceeding twenty-five years, for the establishment of sawmills, lumber yards, timber depots, logging camps, rights-of-way and plantations for the raising of nipa and/or other palms, bacauan, medicinal plants or trees of economic value, and for the construction of hotels, sanatoria, bathing establishments, residences, or camps, fishponds, saltworks pastures for large or small cattle or for other lawful purposes for an area not exceeding twenty-four hectares: *Provided*, That the maximum area shall not exceed two thousand hectares for pastures and plantations for the raising of medicinal plants or trees of economic value and two hundred hectares for fishponds, salt works nipa and/or other palms or bacauan plantations, and rights-of-way.

"Any person or association of persons occupying or using any part of the forest land or vacant public land not declared agricultural land without permit or lease as above required shall be liable to the payment of twice the regular rentals now or hereafter provided for by regulations for such kind of use corresponding to such period that the area is illegally used or occupied. The holder of a permit or lease shall, upon his failure to pay the regular rental charges prescribed in the permit or lease, be liable to the payment of additional charges from ten to one hundred *per centum* of such regular rental charges now or hereafter provided for by regulations promulgated under this Act."

Sec. 2. All acts or parts of acts inconsistent with the provisions of this Act are hereby repealed.

Sec. 3. This Act shall take effect upon its approval.

Approved, June 14, 1947.

F

ACKNOWLEDGMENTS

So many individuals have given so much of their time and labor to help in the compiling of this volume, that it would be impossible to give personal acknowledgment to each and everyone of them, much as we are desirous of doing so. To all these persons we acknowledge herewith our deep debt of gratitude.

The following is a complete list of references and sources:

1. The Bureau of:
    - Mines
    - Science
    - Commerce
    - Agriculture
    - Forestry
    - Census & Statistics
    - Aeronautics
2. Manila Railroad Company
3. Trade Directory of the Philippines — 1946
4. Yearbook of Philippine Statistics — 1946
5. Philippine Mining News
6. Mineral Resources of the Philippines — 1938
7. Philippine Journal of Science — 1941
8. The Commercial and Industrial Manual of the Philippines—1938
9. Chemical and Metallurgical Engineering Magazine — 1939, 1947.

10. *Philippine Economic Development by Thomas Hibben*

11. *Report of the Joint Philippine-American Finance Commission — 1947*

12. *The U. S. I. S. Library, Manila,*
(Courtesy of Mrs. Elsie K. Yoder)

13. *Proposed Iron & Steel Mill for the Commonwealth of the Philippines by S. M. Marshall*

14. *Proposed Iron & Steel Plant for the Philippines by Charles A. Mitke*

15. *Geology and Oil Possibilities of the Philippines by Grant W. Corby*

16. *The Beneficiation of Surigao Iron Ores by the Battelle Memorial Institute*

17. *Report on Mayari Steel by the Bethlehem Steel Corporation*

18. *Geological Report of the Surigao Iron Deposits by Dean F. Frasche*

19. *Reduction of Iron Ores by Thaddeus F. Bailey of Canton, Ohio*

20. *The Journal of Foreign Commerce Weekly*

21. *The Philippines by W. Cameron Forbes*

22. *Phosphate and Superphosphates by A. N. Gray*

23. *Engineering News Record, September 1947*

24. *Various Economic Studies of Industries by the H. E. Beyster Corporation*

25. *Industrialiaztion of Latin America by H. J. Hughlett*

26. *Industrial Report, Mexican-American Commission for Economic Cooperation*

27. *Journal of American Chamber of Commerce*

28. *'Rice' by E. B. Copeland*

29. *Various Technical Publications and Trade Magazines*

ERRATA

Page 208. last paragraph: "Brazilan" should read "Brazilian".

Page 216. line 21: "Mr. Taylor" should read "Mr. Turner".

Page 222. line 23: "servie" should read "service".

Page 241. line 14: "1,2000 hectares" should read "1,200 hectares".

Page 242. line 9 and line 10: should read "grown but costs during the decade
immediately preceding the recent war are as follows:

Page 242. line 19: "cost" should read "costs".

Page 242, line 23 "cost" should read "costs".